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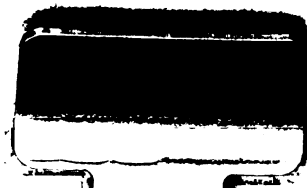
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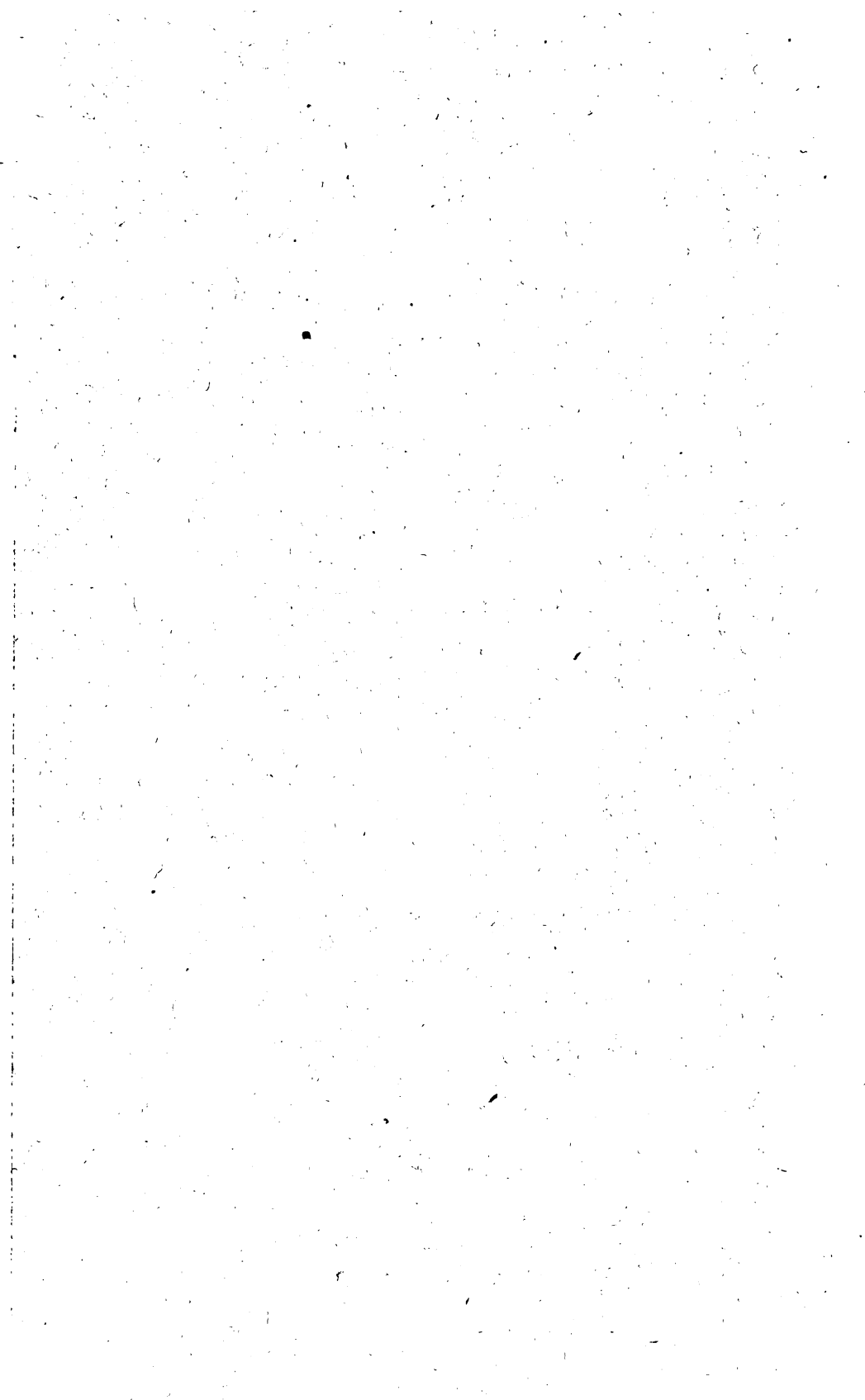


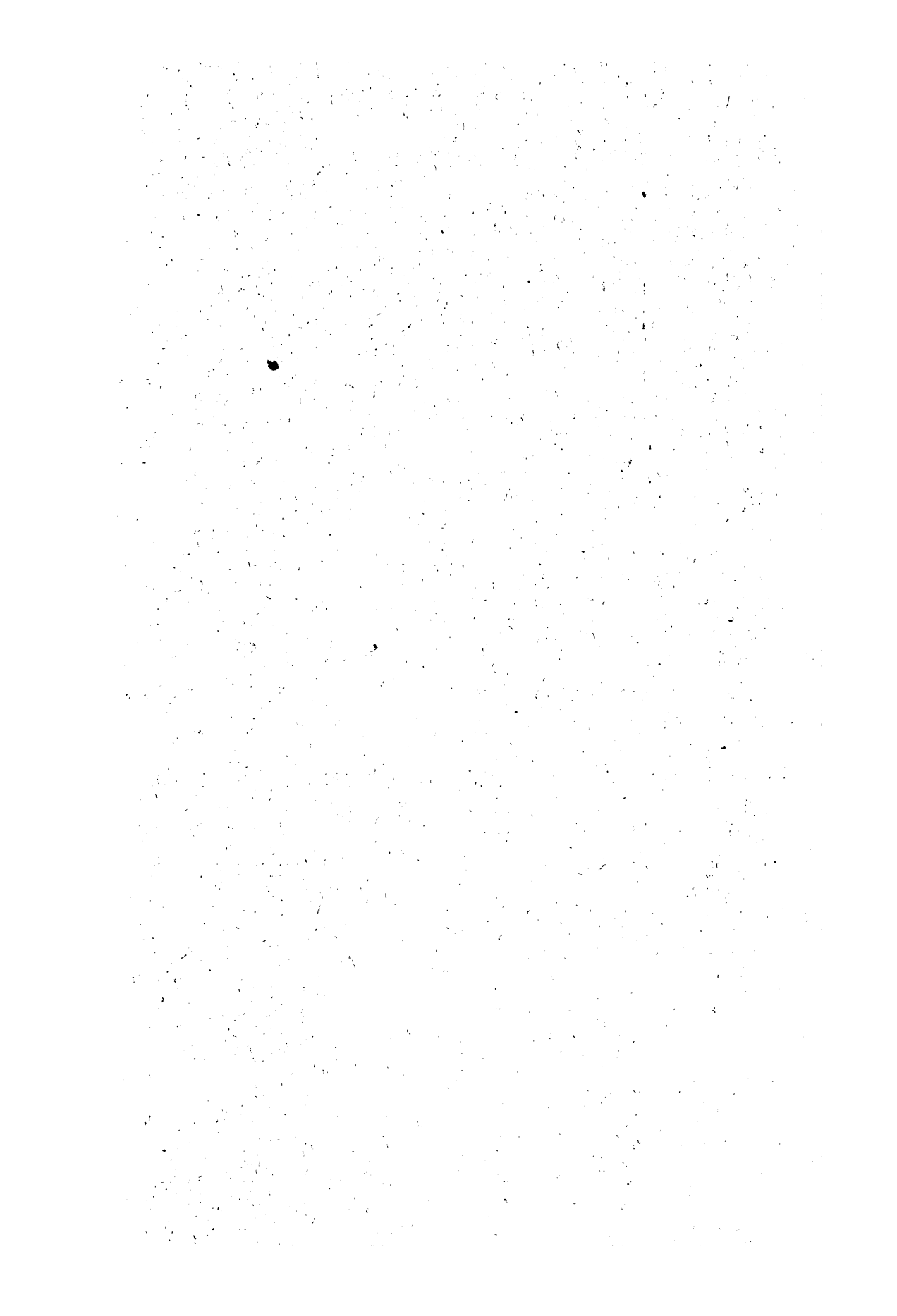
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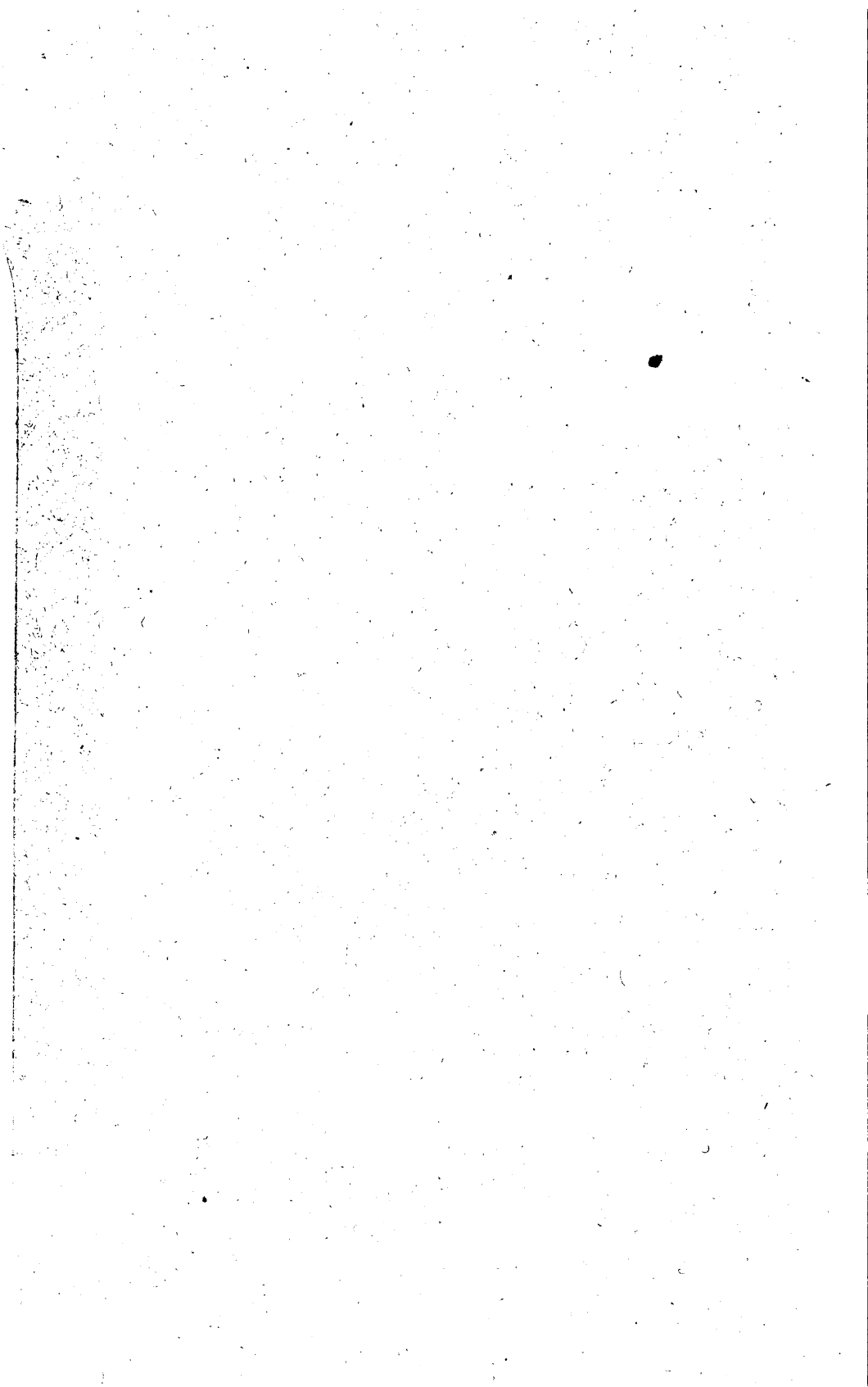
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ANNUAL REPORT
OF THE
MINNESOTA STATE
HORTICULTURAL SOCIETY,
FOR THE YEAR 1888.

EMBRACING THE

TRANSACTIONS OF THE SOCIETY FROM MARCH 31, 1887, TO MARCH 31, 1888;
ALSO PROCEEDINGS OF THE ANNUAL MEETING OF THE
MINNESOTA AMBER CANE ASSOCIATION,
ESSAYS, REPORTS, ETC.

VOL. XVI.



Prepared by the Secretary, S. D. HILLMAN, Minneapolis, Minn.

ST. PAUL:
J. W. CUNNINGHAM & Co., STATE PRINTERS,
1888.

LETTER OF TRANSMITTAL TO THE GOVERNOR.

OFFICE OF THE SECRETARY,
MINNEAPOLIS, March 31, 1888. }

To Hon. A. R. McGill, Governor of Minnesota :

SIR: I have the honor to submit herewith, in compliance with legal requisition, the accompanying report for 1888, with supplementary papers.

Respectfully yours,

S. D. HILLMAN,

Secretary Minnesota State Horticultural Society.

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OFFICERS AND MEMBERS FOR 1888.

PRESIDENT.

WYMAN ELLIOT.....Minneapolis.

VICE PRESIDENTS.

A. W. SIAS.....Rochester.

E. H. S. DARTT.....Owatonna.

M. CUTLER.....Sumter.

N. J. STUBBS.....Long Lake.

G. W. FULLER.....Litchfield.

SECRETARY.

S. D. HILLMAN.....Minneapolis.

TREASURER.

DITUS DAY.....Farmington.

EXECUTIVE COMMITTEE.

The President, Secretary and Treasurer *ex-officio* and

J. S. HARRIS, Chairman.....La Crescent.

J. M. UNDERWOOD.....Lake City.

F. G. GOULD.....Excelsior.

O. F. BRAND.....Faribault.

ISAAC GILPATRICK.....Minneapolis.

ENTOMOLOGIST.

PROF. O. W. OESTLUND.....Minneapolis.

LIBRARIAN.

E. A. CUZNER.....College of Agriculture, Minneapolis.

SUPERINTENDENTS OF EXPERIMENTAL STATIONS.

PROF. EDWARD D. PORTER.....	University Farm, St. Anthony Park.
E. H. S. DARTT.....	Owatonna.
PETER M. GIDEON	Excelsior.
J. S. HARRIS.....	La Crescent.
O. M. LORD.....	Minnesota City.
UNDERWOOD & EMERY.....	Lake City.
A. W. SIAS.....	Rochester.
O. F. BRAND.....	Faribault.
M. PEARCE.....	Minneapolis.
G. W. FULLER.....	Litchfield.
R. M. PROBSTFIELD.....	Moorhead.
ANDREW PETERSON	Waconia.
CHARLES LUEDLOFF	Carver.
B. TAYLOR.....	Forestville.
FRED VON BAUMBACH.....	Alexandria.
L. E. DAY.....	Farmington.

GENERAL FRUIT COMMITTEE.

SIDNEY CORP.....	Hammond.
D. K. MICHENOR.....	Etna.
J. C. KRAMER.....	La Crescent.
O. E. SAUNDERS.....	Granite Falls.
O. F. NORWOOD.....	Balaton, Murray county.
M. C. BUNNELL.....	Newport.
N. J. STUBBS.....	Long Lake.
WILLIAM McHENRY	St. Charles.
O. M. LORD.....	Minnesota City.
CLARENCE WEDGE.....	Albert Lea.
GEORGE E. CASE	St. Peter.
M. CUTLER.....	Sumter.
G. W. FULLER	Litchfield.
L. E. DAY.....	Farmington.
CHARLES LUEDLOFF.....	Carver.
W. H. BRIMHALL.....	St. Paul.
J. H. LUDLOW.....	Worthington.

The members of the General Fruit Committee are expected to report separately on all matters of interest in horticulture, but more especially to bring to the notice of the Society new and improved fruits.

COMMITTEE ON LEGISLATION.

WYMAN ELLIOT.....Minneapolis.
 PROF. E. D. PORTER.....St. Anthony Park.
 J. T. GRIMES.....Minneapolis.

COMMITTEE ON SEEDLING FRUITS.

J. S. HARRIS.....La Crescent.
 A. W. SIAS.....Rochester.
 G. W. FULLER.....Litchfield.

COMMITTEE ON APPLES, PEARS AND PLUMS.

J. S. HARRIS.....La Crescent.
 CHAS. A. KEEFER.....Brookings, Dak.
 ISAAC GILPATRICK.....Minneapolis.

COMMITTEE ON NATIVE FRUITS.

O. M. LORD.....Minnesota City.
 OLIVER GIBBS, JR.....Ramsey, Dak.
 J. O. BARRETT.....Browns Valley.

COMMITTEE ON RUSSIAN APPLES.

CHARLES LUEDLOFF.....Carver.
 A. W. SIAS.....Rochester.
 A. PETERSON.....Waconia.

COMMITTEE ON GRAPES AND SEEDLINGS.

R. KNAPHEIDE.....St. Paul.
 A. W. LATHAM.....Excelsior.
 M. PEARCE.....Minneapolis.

COMMITTEE ON GRAPE DISEASES.

J. S. HARRIS.....La Crescent.
 A. W. LATHAM.....Excelsior.
 CHARLES LUEDLOFF.....Carver.

COMMITTEE ON EXPLORATION FRUITS AND FLOWERS.

PROF. E. D. PORTER.....St. Anthony Park.
 S. D. HILLMAN.....Minneapolis.
 A. W. SIAS.....Rochester.

COMMITTEE ON FORESTRY.

PROF. P. P. SCHOTZKA.....Minneapolis.
 C. L. SMITH.....Minneapolis.
 J. W. BOXELL.....St. Paul.

COMMITTEE ON EVERGREENS.

J. T. GRIMES.....	Minneapolis.
O. F. BRAND.....	Faribault.
H. R. HUNTER.....	Sioux Falls, Dak.

COMMITTEE ON DECIDUOUS TREES AND SHRUBS.

H. W. S. CLEVELAND.....	Minneapolis.
S. M. EMERY.....	Lake City.
M. J. HOAG.....	Minneapolis.

COMMITTEE ON FRUIT BLOSSOMS.

PROF. E. D. PORTER.....	St. Anthony Park.
GEO. P. PEPPER.....	Pewaukee, Wis.
J. S. HARRIS.....	La Crescent.

COMMITTEE ON GREENHOUSES AND HOTBEDS.

R. J. MENDENHALL.....	Minneapolis.
E. A. CUZNER.....	Agricultural College, Minneapolis.
SMITH & DARLING.....	Winona.

COMMITTEE ON FLORICULTURE.

MRS. C. O. VAN CLEVE.....	Minneapolis.
MRS. M. S. GOULD.....	Excelsior.
MRS. ANNA B. UNDERWOOD.....	Lake City.

COMMITTEE ON NOMENCLATURE.

A. W. SIAS.....	Rochester.
J. S. HARRIS.....	La Crescent.
L. H. WILCOX.....	Hastings.

COMMITTEE ON SMALL FRUITS.

E. DE BELL.....	Sioux Falls, Dak.
PROF. L. ASIRE.....	Minneapolis.
F. G. GOULD.....	Excelsior.

COMMITTEE ON VEGETABLE GARDENING.

WILLIAM LYONS.....	Minneapolis.
JOSHUA ALLYN.....	Red Wing.
FRED BUSCH.....	Richfield.

COMMITTEE ON MARKETING AND NEW HORTICULTURAL
APPLIANCES.

F. G. GOULD.....	Excelsior.
M. PEARCE.....	Minneapolis.
WILLIAM H. BRIMHALL.....	St. Paul.

COMMITTEE ON HONEY AND SYRUP.

WILLIAM URIB.....	Minneapolis.
WILLIAM DANFORTH.....	Red Wing.
SETH H. KENNEY.....	Morristown.

COMMITTEE ON BREAD AND CAKE.

MRS. WILLIAM H. BRIMHALL.....	St. Paul.
MISS M. ESTELLE PORTER.....	St. Anthony Park.
MISS MARY GRIMES.....	Minneapolis.

COMMITTEE ON PICKELS, PRESERVES AND CANNED
GOODS.

MRS. E. J. STAGER.....	Sauk Rapids.
MRS. O. C. GREGG.....	Minneapolis.
MRS. WILLIAM LYONS.....	Minneapolis.

COMMITTEE ON ENTOMOLOGY.

PROF. O. W. OESTLUND.....	Minneapolis.
R. J. MENDENHALL.....	Minneapolis.
J. S. HARRIS	La Crescent.

ANNUAL MEMBERS.

ALLYN, JOSHUA	Red Wing.
ANDREWS, J. P.....	Faribault.
AUSTIN, L. E.....	Leola, Dak.
BARRETT, J. O.....	Browns Valley.
BERG, C. L	Wegdahl.
BOXELL, J. W.....	St. Paul.
BRAND, NORTON F.....	Faribault.
BRAND, O. F.....	Faribault.
BRIMHALL, WILLIAM H.....	St Paul.
BROWN, C. F.....	St. Peter.
BUNNELL, M. C.....	Newport.
BUSSE, H. F.....	Minneapolis.
COOK, DEWAIN.....	Windom.
CORP, SIDNEY.....	Hammond.
CROSS, MRS. E.	Sauk Rapids.
CUTLER, MILON.....	Sumter.
CUZNER, E. A.....	Minneapolis.
DANFORTH, WILLIAM.....	Red Wing.
DARTT, E. H. S.....	Owatonna.
DAY, DITUS	Farmington.
DEVOL, W. S.....	Columbus, Ohio.
DOUGHTY, J. COLE.....	Lake City.

FLANDERS, G. H.	Chowen.
FOGG, F. A.	Sauk Rapids.
FRANKLAND, THOMAS.	Stonewall, Man.
FULLER, G. W.	Litchfield.
GILBERT, FRED A.	Beardsley.
GILMORE, H.	Georgetown, Wis.
GILPATRICK, ISAAC	Minneapolis.
GOULD, G. B.	Minneapolis.
GOULD, F. G.	Excelsior.
GOULD, MRS. M. S.	Excelsior.
GRAY, J. S.	Minneapolis.
GUSTAFSON, CHARLES	Worthington.
HALE, ROBERT	Minneapolis.
HALL, PROF. C. W.	Minneapolis.
HARRINGTON, G. W.	Plainview.
HAUGAN, A. C.	Minneapolis.
HERZOG, PHILIP	Minneapolis.
HILLMAN BROS	Minneapolis.
HILLMAN, S. D.	Minneapolis.
HARRIS, EUGENE E.	La Crescent.
HARRIS, FRANK I.	La Crescent.
JACKSON, E. D.	Minneapolis.
JACKSON, GEORGE R.	Manchester, N. H.
KENNEY, SETH H.	Morristown.
KRAMER, J. C.	La Crescent.
LATHAM, A. W.	Excelsior.
LATHAM, R. A.	Excelsior.
LABBETT, GEORGE	Lake City.
LEUDELOFF, CHARLES.	Carver.
LOBY, H. A.	Maple Ridge.
LYONS, MISS JULIA.	Minneapolis.
LYONS, WILLIAM	Minneapolis.
McHENRY, S. A.	St. Charles.
MACINTOSH, WILLIAM.	Langdon.
MAGWOOD, ARMOUR.	Stonewall, Man.
MARTIN, WILLIAM L.	Smith's Mill.
MILLS, L. D.	Garden City.
MITCHELL, G. A.	Minneapolis.
NOBLE, J.	Sumter.
NORBY, A.	Madison, Dak.
NORQUIST, JOHN	Red Wing.

OWEN, S. M	Minneapolis.
PARKER, W. L	Farmington.
PARTRIDGE, SAM.....	Moorhead.
PETERSON, ANDREW.....	Waconia.
POND, C. H.....	Kasson.
POOR, HAMLIN V.....	Bird Island.
PORTER, PROF. EDWARD D.....	St. Anthony Park.
PORTER, J. F.....	Red Wing.
PUFFER, DR. F. L.....	Bird Island.
ROGERS, G. A.....	Red Wing.
SCHOTZKA, PROF. P. P.....	Minneapolis.
SHIRK, DR. J. K.....	Lancaster, Pa.
SMITH, CYRUS L.....	Minneapolis.
SMITH, FLORENCE	Cresbard, Dak.
SMITH, MISS GRACE L.....	Minneapolis.
SMITH, JAMES.....	Cresbard, Dak.
SMITH, S. B.....	Morris.
SOMERVILLE, WILLIAM.....	Viola.
STEINERSON, H.....	Madison.
STAGER, MRS. E. J.....	Sauk Rapids.
STRANDWOLD, O.....	Trysil, Dak.
STUBBS, N. J.....	Long Lake.
TERRY, ALFRED.....	Slayton.
UNDERWOOD, MRS. ANNA B.....	Lake City.
UNDERWOOD, J. M.....	Lake City.
URIE, WILLIAM.....	Minneapolis.
VARLEY, C.....	Big Lake.
WENTWORTH, DR. F. H.....	Cresbard, Dak.
WHITE, J. H.....	Crystal.
WILCOX, ARCHIE N.....	Hastings.
WILCOX, BURTON T.....	Hastings.
WILCOX, L. H	Hastings.
YOUNG, H. H.....	St. Paul.

HONORARY MEMBERS FOR FIVE YEARS.

EDSON GAYLORD, from 1886.....	Nora Springs, Iowa.
J. E. CORLETT, from 1887.....	Farmersburg, Iowa.
B. S. HOXIE.....	Evansville, Wis.
H. R. HUNTER.....	Sioux Falls, Dak.
C. H. BRETT.....	Henry, Dak.
J. S. B. THOMPSON, from 1888.....	Grundy Center, Iowa.
MISS EDITH A. KELLOGG.....	Janesville, Wis.

HONORARY LIFE MEMBERS

HON. MARSHALL P. WILDER (deceased)	Boston, Mass.
DR. JOHN P. WARDER (deceased)	North Bend, Ohio.
DR. P. A. JEWELL (deceased)	Lake City.
HON. L. B. HODGES (deceased)	St. Paul.
D. W. HUMPHREY (deceased)	Faribault.
CHARLES HOAG (deceased)	Minneapolis.
HON. N. J. COLMAN	St. Louis, Mo.
GEORGE P. PEPPER	Pewaukee, Wis.
J. C. PLUMB	Milton, Wis.
J. M. SMITH	Green Bay, Wis.
E. WILCOX	La Crosse, Wis.
PROF. J. L. BUDD	Ames, Iowa.
CHARLES GIBB	Abbotsford, Quebec.
A. G. TUTTLE	Baraboo, Wis.
F. K. PHOENIX	Delavan, Wis.
J. W. MANNING	Boston, Mass.
MRS. J. W. MANNING	Boston, Mass.
MRS. WM. PAIST	Hersey
CHARLES Y. LACEY	Fort Benton, M. T.
COL. J. H. STEVENS	Minneapolis.
J. S. HARRIS	La Crescent.
R. J. MENDENHALL	Minneapolis.
H. W. S. CLEVELAND	Minneapolis.
TRUMAN M. SMITH	San Diego, Cal.
L. M. FORD	San Diego, Cal.
WYMAN ELLIOT	Minneapolis.
J. T. GRIMES	Minneapolis.
A. W. SIAS	Rochester.
PETER M. GIDEON	Excelsior.
MRS. WEALTHY GIDEON	Excelsior.
M. PEARCE	Minneapolis.
COL. D. A. ROBERTSON	St. Paul.
R. L. COTTERELL	Dover.
CHARLES LEUDLOFF	Carver.
OLIVER GIBBS, JR.	Ramsey, Dak.
ANDREW PETERSON	Waconia.
MRS. C. O. VAN CLEVE	Minneapolis.
MRS. JAMES BOWEN	Minneapolis.
MRS. IDA E. TILSON	West Salem, Wis.
MRS. H. B. SARGEANT	Lake City.
MISS SARAH MANNING	Lake City.

OFFICERS
OF THE
Minnesota State Agricultural Society

FOR THE YEAR 1888.

PRESIDENT.

WM. R. MERRIAM.....St. Paul.

VICE PRESIDENTS.

F. C. PILLSBURY, First.....Minneapolis.

JAMES McHENCH, Second.....Fairmont.

SECRETARY.

H. R. DENNY.....Hamline.

TREASURER.

F. J. WILCOX.....Northfield.

. BOARD OF MANAGERS.

JOHN F. NORRISH.....Hastings.

CLARKE CHAMBERS.....Owatonna.

JOHN COOPER.....St. Cloud.

A. N. JOHNSON.....Benson.

L. H. PROSSER.....Wykoff.

C. N. COSGROVE.....Le Sueur.

The next annual fair will be held on the State Fair grounds between Minneapolis and St. Paul, Sept. 10 to 15, 1888. No effort will be spared to make it the best agricultural and horticultural exposition of the year.

Much more liberal premiums offered in every department than ever before. For further information address the secretary, as above.

CONSTITUTION
OF THE
MINNESOTA HORTICULTURAL SOCIETY

ARTICLE I.

NAME.

This Society shall be known as the Minnesota State Horticultural Society.

ARTICLE II.

OBJECT OF THE SOCIETY.

The object of this Society shall be to improve the condition of pomology, horticulture and arboriculture, by collecting and disseminating correct information concerning the culture of such fruits, flowers, trees, and other productions in horticulture as are adapted to the soil and climate of Minnesota.

ARTICLE III.

MEMBERSHIP.

Any person may become a member by paying to the secretary or treasurer an annual fee of one dollar, or a life member by the payment of ten dollars. Honorary members, for a time stated or for life, may be elected at any annual meeting by a two-thirds vote of the Society, and shall be entitled to all the rights and privileges of membership; provided, that honorary life members may pay a fee of ten dollars, in two equal annual payments of five dollars.

ARTICLE IV.

OFFICERS.

Its officers shall consist of a president and one vice president from each congressional district, a secretary, treasurer, and an executive committee of five, and librarian.

ARTICLE V.

DUTIES OF PRESIDENT AND VICE PRESIDENTS.

The president shall preside at and conduct all meetings of the Society, and deliver an annual address, and in his absence the vice presidents, in their order, shall perform the same duties. They shall also have a general supervision of the horticultural interests in their respective districts, and make a written report to the Society at its annual winter meeting; in consideration of which the Society shall pay their traveling expenses to the same.

ARTICLE VI.

THE SECRETARY.

The secretary shall record all the doings of the Society, collate and prepare all communications, etc., for the public press, and pay over all moneys received from members or otherwise to the treasurer on his receipt; receive and answer all communications addressed to the secretary, establish and maintain correspondence with all local, county, district and state horticultural societies, and secure by exchange their transactions, as far as possible; to aid the president as an executive officer in the dispatch of business relating to the meetings of the Society, notices of horticultural and similar meetings of general interest, and report to the annual meeting of the Society an abstract of the matter that has come into his possession, which, with its approval, shall become part of its transactions of the current year.

ARTICLE VII.

THE TREASURER.

The treasurer shall collect and hold all funds of the Society, and pay out the same only on the order of the president, countersigned by the secretary. He shall make up a report of all the receipts and disburse-

ments of the Society, and present the same at the annual winter meeting, or any other time when called upon to do so by the executive committee. He shall give bonds in such sum as the Society may direct, to be approved by the president and secretary, and the bond when so approved shall be filed with the state auditor.

ARTICLE VIII.

ELECTION OF OFFICERS.

The officers shall be elected separately and annually by ballot; and hold their office until their successors are elected.

ARTICLE IX.

MEETINGS OF THE SOCIETY.

The Society shall hold annual sessions on the third Tuesday of January, and other meetings at such time and place as the Society may direct.

ARTICLE X.

THE LIBRARIAN.

The librarian shall have charge of the library and report its condition at each annual meeting.

ARTICLE XI.

AMENDMENTS.

By-laws and alterations of the constitution for the purpose of meeting the further wants of the Society, may be enacted by a vote of two-thirds of the members present at any regular annual meeting, and on one day's notice of the same being given.

BY-LAWS.

1. The president, at each annual meeting of the Society, shall appoint a general fruit committee, consisting of two members from each congressional district in the State, and it shall be the duty of each member to make a written report annually upon the fruit crop, and a limited list of fruits best adapted for general cultivation in their respective districts.

2. The president, secretary and treasurer shall be members *ex-officio* of the executive committee, who shall have charge of all matters pertaining to the interests of the Society.

3. The executive committee may call a meeting of the Society at any time they may deem advisable, giving at least thirty days' notice through the public press.

4. The executive committee shall appoint a committee on seedlings, on nomenclature, on forestry, on fruit blossoms, on Russian apples, on gardening, on small fruits, and on floriculture.

5. The five members of the executive committee, not including the president, secretary or treasurer, shall be a committee on finance, and it shall be their duty to audit all bills before they shall be ordered paid by the president and secretary.

6. The executive committee shall see that a program is issued for each meeting of the Society, at least one month before the winter meeting and ten days before the summer meeting.

7. Every member shall be entitled to one copy of the transactions as often as published, on which postage shall be paid; but in the distribution of all other copies the party receiving the same shall pay the postage. Where several copies are sent to auxiliary societies it shall be discretionary with the secretary to pay the freight.

8. *Quorum*.—A quorum shall consist of nine members of the Society, or a majority of the executive committee.

MINNESOTA STATE HORTICULTURAL SOCIETY.

TRANSACTIONS 1887-8.

TWENTY-FIRST ANNUAL MEETING.

AT MARKET HALL, MINNEAPOLIS, TUESDAY, WEDNESDAY, THURSDAY
AND FRIDAY, JANUARY 17, 18, 19 AND 20, 1888, IN JOINT
SESSION WITH STATE AMBER CANE ASSOCIATION.

[NOTE.—This Society will not be held responsible for individual opinions which are found in this report.—Secretary.]

Following is the circular sent out announcing the annual winter meeting of the Society:

The Twenty-first Annual Winter Meeting of the State Horticultural Society will be held at Minneapolis, on January 17th to 20th, inclusive, 1888, the State Amber Cane Association occupying the time for its Eleventh Annual Session on the afternoon of Wednesday, January 18th.

A cordial invitation is extended to kindred organizations in other States, as well as to those of Local Societies, to send delegates to the meetings, which are *free to all*. Ladies are especially invited to attend and take part in the exercises.

All members are especially urged to be present and to render such assistance as may be necessary to make the session one of interest and profit. If you have succeeded in growing fruit come and tell us about it, or if you wish to know more about it come and ask questions. We want a lively and wide awake session.

Members of special and standing committees are expected to report in person or by manuscript; let the same be brief and to the point. This is important as indicating what progress is being made in fruit and vegetable culture throughout the State.

Liberal premiums will be given for exhibits of fruits, flowers and vegetables, etc., but not on inferior or unworthy articles, even if there is no competition. It is hoped that a large exhibit may be made.

SPECIAL PREMIUMS FOR ESSAYS.

The Society offers the following special prizes for essays from young men and women under twenty-five years of age:

Best essay on "Orcharding for Minnesota,"	\$25 00
Best essay on "Grape Growing in Minnesota,"	25 00
Best essay on "Strawberries and Raspberries in Minnesota,"	25 00
Best essay on "Blackberries and Dewberries in Minnesota,"	25 00
Best essay on "Currants and Gooseberries in Minnesota,"	25 00

The following lines of railway will return delegates at reduced rates of fare, to wit: St. Paul & Duluth Railway, one-third fare; the Northern Pacific Railroad and the Minneapolis & Pacific Railways, at one-fifth fare, provided receipts are obtained from station agents at starting points, showing full fare has been paid one way.

The following lines of railway will return delegates upon the certificate plan, to points within the State, at one-third fare, to wit: Chicago, Milwaukee & St. Paul Railway, Chicago & Northwestern Railway, Chicago, St. Paul, Minneapolis & Omaha Railway, St. Paul & Kansas City Railway, Minneapolis & St. Louis Railway and the Burlington and Northern Railroad.

Delegates on purchasing a full fare ticket going, will secure at the same time from the station agent a Delegate's Convention Receipt or Certificate specifying that such ticket has been purchased, which receipt, on being properly filled out and signed by the secretary of the Society, and presented to the local railway agent at Minneapolis, will authorize the return of the delegate at the reduced rates, provided such certificate is presented on or before Jan. 23, 1888.

Where delegates pass over two or more railways en route to the meeting and do not obtain through tickets, they should procure receipts for the full fare paid each line, for each ticket purchased, as separate return tickets will be issued by each company. Such tickets are provided by the Chicago & Northwestern Railway at Winona, Dodge Center, Owatonna, Waseca and Kasota.

Members in attendance from a distance will be provided with entertainment by the local committee on arrangements.

For further particulars address

S D. HILLMAN, *Secretary*,

MINNEAPOLIS.

WYMAN ELLIOT, *President*,

MINNEAPOLIS.

State Horticultural Society.

PROF. E D. PORTER, *Secretary*,

ST. ANTHONY PARK

State Amber Cane Association

RUSSELL BLAKELEY, *President*,

ST. PAUL.

PROGRAM.

The following order will be adhered to as near as circumstances will permit, but may be varied from time to time as the Society may deem best.

FIRST DAY—TUESDAY, JANUARY 17, AT 10 A. M.

Opening Exercises. Arrangements of Exhibits and Reception of Members.

Appointment of Committees. Committees on Fruit List; on Award of Premiums; on Publication; on Final Resolutions; on Obituary.

AFTERNOON SESSION—AT 2 P. M.

Address of Welcome. Isaac Atwater, President Board of Trade.

Response to Address of Welcome. E. H. S. Dartt, Owatonna.

Reports from Local Societies. Hennepin County Horticultural Society, Prof. L. Asire, Secretary, Minneapolis; Olmsted County Horticultural Society, M. J. Hoag, Rochester; Minnesota Valley Horticultural Society, A. B. Regester, Granite Falls; Lake Side Horticultural Society, A. S. Crossfield, Browns Valley; McLeod County Horticultural Society, H. I. Corson, Glencoe; Ramsey County Agricultural and Horticultural Society, Adam Bobland, St. Paul.

Correspondence, etc.

Horticultural Experiment Stations and how to conduct them. E. H. S. Dartt, Owatonna.

Discussion on same.

Question Box.

EVENING SESSION—AT 7 P. M.

President's Annual Address. Wyman Elliot, Minneapolis.

Grape Culture. N. J. Stubbs, Long Lake.

The Tree Peddler. A. W. Sias, Rochester.

SECOND DAY—WEDNESDAY, JANUARY 18, AT 9 A. M.

Report of Seedling Commission. John S. Harris, La Crescent; G. W. Fuller, Litchfield; A. W. Sias, Rochester.

Report of Committee on Native Fruits. O. M. Lord, Minnesota City.

Report of Committee on Russian Apples. Chas. Luedloff, Carver.

Discussion on same.

Forcing Houses for Vegetable Culture in Winter. J. S. Gray, Minneapolis.

AFTERNOON SESSION—AT 2 P. M.

Eleventh Annual Meeting of the State Amber Cane Association.

Minutes of Last Meeting Read.

Reception of Members.

Report of Secretary and Treasurer.

Election of Officers.

Appointment of Committees.

President's Address. Russell Blakeley, St. Paul.

Improvements in Machinery and Process of Manufacture. B. Densmore, Red Wing.

Present Condition of the Amber Cane Industry. Seth H. Kenney, Morristown.

Reports from Growers and Manufacturing of Amber Cane.

Report from Station at Fort Scott, Kas. M. Swenson, Director.

Discussion.

EVENING SESSION—AT 7 P. M.

Music.

Street and Lawn Planting with Trees and Ornamental Shrubs. H. W. S. Cleveland, Minneapolis.

Sanitary Management of Cities as Related to Horticulture, or, the Disposal of City Cleanings. Lecture by Prof. Wm. W. Folwell, of State University.

Governor McGill has promised to be present and to address the Society briefly.

THIRD DAY—THURSDAY, JANUARY 19, AT 9 A. M.

Annual Report of Secretary

Annual Report of Treasurer.

The Culture of Small Fruits. Wm. Danforth, Red Wing.

Report of Committee on Small Fruits.

Discussion on Same.

Culture of the Dewberry. De Wain Cook, Windom.

Five Minute Papers on Vegetables. By Practical Gardeners.

Early Beets and Tomatoes. Joshua Allen, Red Wing.

Report of Finance Committee.

AFTERNOON SESSION—AT 2 P. M.

Principles of Drainage as Related to Horticulture. Rufus Cook, Minneapolis.

Ad Interim or District Reports, by Vice-Presidents of the Society. A. W. Sias, Rochester, E. H. S. Dartt, Owatonna; M. Cutler, Sumter; N. J. Stubbs, Long Lake; G. W. Fuller, Litchfield.

Annual Election of Officers. By Ballot.

Value of Evergreens. O. F. Brand, Faribault.

Report of Committee on Evergreens.

Report of Committee on Forestry.

Scaler's Experience in Northern Pineries. J. W. Eastman, Minneapolis.

Report of Work of State Forestry Association. C. L. Smith, Minneapolis.

Discussion on Same.

EVENING SESSION—AT 7 P. M.

Music.

Report of Committee on Floriculture. Mrs. C. O. Van Cleve, Minneapolis; Mrs. Anna B. Underwood, Lake City; Mrs. M. S. Gould, Excelsior.

Amateur Flower Garden. Frank. H. Carleton, Minneapolis.

Entomologist's Report. Prof. O. W. Oestlund, Minneapolis.

Early Experience in Orchardng in Minnesota. Prof. W. W. Pendergast, St. Paul.

FOURTH DAY—FRIDAY, JANUARY, 21ST, AT 9 A. M.

The Apple; What may we reasonably expect of it in Minnesota. O. F. Brand, Faribault.
Reports from Experimental Stations:

PROF. E. D. PORTER, St. Anth'y P'k. CHARLES LUEDLOFF, Carver.

PETER M. GIBSON, Excelsior. UNDERWOOD & EMERY, Lake City.

M. PEARCE, Minneapolis. B. TAYLOR, Forestville.

G. W. FULLER, Litchfield. FRED VON BAUMBACH, Alexandria.

A. W. SIAS, Rochester. E. H. S. DARTT, Owatonna.

R. M. PROBSTFIELD, Moorhead. L. E. DAY, Farmington.

F. J. SCHREIBER, Moorhead. J. S. HARRIS, La Crescent.

ANDREW PETERSON, Waconia. O. M. LORD, Minnesota City.

Report of General Fruit Committees :

SIDNEY CORP, Hammond.	CLARENCE WEDGE, Albert Lea.
D. K. MICHEBOR, Etna.	GEORGE E. CASE, St. Peter.
J. C. KRAMER, La Crescent.	M. CUTLER, Sumter.
O. E. SAUNDERS, Granite Falls.	G. W. FULLER, Litchfield.
O. F. NORWOOD, Balaton.	L. E. DAY, Farmington.
M. C. BUNNELL, Newport.	CHARLES LUEDLOEF, Carver.
N. J. STUBBS, Long Lake.	W. E. BRIMHALL, St. Paul.
WILLIAM MOHENRY, St. Charles.	M. T. DUNCAN, Fergus Falls.
O. M. LORD, Minnesota City.	H. J. LUDLOW, Worthington.

*Discussion on Same.**Native Plums.* D. B. Wier, Lacon, Ill.*Reports of Special Fruit Committees on Fruit Lists.**Report of Committees on Award of Premiums.**Report of Committee on Nomenclature.*

AFTERNOON SESSION—AT 2 P. M.

Gardening and Moral Influence of Flowers. Robert Hale, Minneapolis.*Benefits of Forests.* J. O. Barrett, Browns Valley.*Reports of Special Committees.**Report of Committee on Legislation.* Prof. E. D. Porter, St. Anthony Park.*Report of Committee on Final Resolutions.**Place of Next Meeting.**Miscellaneous Business.**Final Adjournment.*

PREMIUM LIST.

 WM. H. BRIMHALL, ST. PAUL, SUPERINTENDENT OF EXHIBITS.

APPLES.

(All Plates to consist of five specimens.)

Best collection of Minnesota apples, including hybrids, first premium, \$5 ; second, \$3 ; third, \$2.

Best display of Wealthy, first premium, \$3 ; second, \$2 ; third, \$1.

Best plate of winter apples, any variety, first premium, \$2 ; second, \$1.

Best plate of winter varieties Russian apples, first premium, \$2 ; second, \$1.

Best plate of hybrids, first premium, \$2 ; second, \$1.

GRAPES.

Best display of native grapes, in good condition, first premium, \$5 ; second, \$3 third, \$2.

Best plate, any variety, first, \$3 ; second, \$2.

Best display of fruit in glass jars, first premium, \$5 ; second, \$3.

ANNUAL REPORT

PLANTS AND FLOWERS.

	1st Prem.	2d Prem.
Best display ornamental and flowering plants.....	\$5 00	\$3 00
Best display of roses in pots.....	2 00	1 00
Best display of geraniums.....	2 00	1 00
Best single plant in bloom.....	2 00	1 00
Best display begonias.....	2 00	1 00
Best display carnations.....	2 00	1 00

OUT FLOWERS.

Best and most artistically arranged design, first premium, \$5; second, \$3.

Best collection of roses, first premium, \$3; second, \$2.

Best hand bouquet, first premium, \$3; second, \$2.

Best cultivated cranberries, provided a history of their cultivation be furnished, first premium, \$5; second, \$3; third, \$2.

VEGETABLES.

	1st Prem.	2d Prem.
Best display.....	\$5 00	\$3 00
Best half peck early potatoes.....	2 00	1 00
Best half peck potatoes for winter and spring.....	2 00	1 00
Best half peck onions.....	2 00	1 00
Best half peck turnips.....	2 00	1 00
Best half peck beets.....	1 00	50
Best half peck parsnips.....	1 00	50
Best half peck carrots.....	1 00	50
Best Hubbard squash.....	1 00	50
Best six bunches celery.....	1 00	50
Best winter cabbage.....	1 00	50

SEEDS.

Best display of Minnesota garden seeds, first premium, \$5; second, \$3.

PANTRY STORES.

Best display canned fruits, \$3; second best, \$2.

Best display of jellies, \$2; second best, \$1.

Best jar mixed pickels, \$1; second best, 50 cents.

Best sample home-made vinegar, \$1; second best, 50 cents.

Best sample comb honey, \$1; second best, 50 cents.

Best sample strained honey, \$1; second best, 50 cents.

WORKS OF ART.

Collection of paintings, fruits and flowers, first premium, \$5; second, \$3.

Best single fruit painting, \$3; second best, \$2.

Display garden tools and horticultural implements. Certificate of honorable mention.

Exhibitors are expected to make their entries the first day. All exhibits must be in place by 10 o'clock, A. M., the second day.

Competition shall be open to all, but it is expected that the annual membership fee (\$1) will be contributed unless exhibitors are members of the Society. All members are entitled to bound copies of the Transactions.

MINNESOTA STATE HORTICULTURAL SOCIETY.

ANNUAL WINTER MEETING.

AT MARKET HALL, MINNEAPOLIS, TUESDAY, WEDNESDAY, THURSDAY
AND FRIDAY, JANUARY 17, 18, 19, AND 20, 1888, IN JOINT
SESSION WITH STATE AMBER CANE ASSOCIATION.

The twenty-first annual winter meeting of the State Horticultural Society, held at Market Hall, Minneapolis, convened on Tuesday morning, Jan. 17, 1888. The meeting was called to order shortly before 11 o'clock, by the President, Wyman Elliot, of Minneapolis.

Prayer was offered by Prof. G. E. McLean, of the State University, Minneapolis.

President Elliot announced the following committees:

Committee on Award of Premiums: M. C. Bunnell, Newport; J. S. Harris, La Crescent; Mrs. M. S. Gould, Excelsior.

Committee on Fruit Lists: A. W. Sias, Rochester; J. S. Harris, La Crescent; M. Pearce, Minneapolis.

Committee on Final Resolutions: Col. J. H. Stevens, Minneapolis, A. W. Sias, Rochester; G. W. Fuller, Litchfield.

Committee on Obituary: J. S. Harris, La Crescent; C. L. Smith, Minneapolis; S. D. Hillman, Minneapolis.

Committee on Publication: Col. J. H. Stevens, of Minneapolis; with the President and Secretary.

President Elliot stated it would perhaps be proper to name committees on Award of Premiums on Essays.

Mr. Pearce. So far as the essays are concerned I think it is better to have them read and awards made by the Society as a whole.

Mr. Harris If there is time to have them read carefully that would

answer; but I think a committee can arrive at a decision by taking time better than the Society could do from simply hearing them read.

President Elliot. I am aware that there was delay in awarding the prize on essays at a former meeting; but I think committees can be secured that will act promptly and perform the work with acceptance. The appointment of those committees will be deferred for the present.

Prof. McLean stated that owing to engagements at the university he would be obliged to retire. He hoped the members of the Society would find time to visit the State University for the purpose of observing the methods pursued in the different departments of that institution, where they would be welcome at any time.

The resignation of Treasurer Grimes was announced, and, on motion, William H. Brimhall, of Hamline, was appointed Treasurer, *pro tempore*. The balance of the forenoon was devoted to the arrangement of exhibits, etc.

The meeting adjourned until 2 o'clock P. M.

AFTERNOON SESSION.

TUESDAY, JAN. 17, 1888.

The meeting was called to order by President Elliot at 2 o'clock, P. M.

The attendance of delegates was much larger than expected, considering the severity of the weather of the preceding week, and the blockaded condition of the railroads and the public highways in the country. The temperature ranged some twenty-five or thirty degrees higher than for several days preceding the meeting. The number of members present at the opening session gave evidence of awakened interest and a successful meeting.

A large and very fine display of flowers and exotic plants was made by the Mendenhall Greenhouse. But few other entries were made during the first day's session.

ADDRESS OF WELCOME.

Hon. Isaac Atwater, president of the Minneapolis Board of Trade was introduced and delivered the following Address of Welcome:

Mr. President and Gentlemen of the State Horticultural and Amber Cane Associations:

I feel especial pleasure in that I have the honor, on behalf of the citizens of Minneapolis, to welcome you to our city to hold your de-

liberations. I hope you will not take this as a mere formal expression of courtesy, usual on such occasions, for I know of no association of men or women whose aims and occupations are more nearly related to the highest interests of our city—and when I say city I include the State—than those which you represent.

As you are aware, our beautiful city, thus early in her history, has already become somewhat famous for her conventions. The disciples of all professions—theology, medicine, law, agriculture, the arts and sciences—all here find their favorite place of rendezvous; nay, indeed, so ambitious have our people become in this direction, that lately, as you are aware, they even attempted to capture one of the largest political parties of the country, to hold its convention in this city. The attempt, however, was unsuccessful. But had it been otherwise, I doubt if the expenditure of time and money, and I may add spiritual condiments, would have inured an hundred-fold more to the interests of the city and State, had it been devoted to the development of the industries you represent.

Gentlemen, the city of Minneapolis has cause to feel proud that you honor her to-day with your presence. Your discussions it may be tend to some extent to your personal interest, but this city and this State will gain an hundred-fold more than you yourselves.

You are the men who, by patience, intelligence, skill and energy, have placed on our tables as appetizing fruits as any reasonable man can desire—as beautiful flowers as Paradise can offer—and delicious sweets, scarcely inferior to those of Cuba.

This we already know. We know that even the simple parlor of the laboring man may be adorned all the dreary winter long with flowers which make his home a lovely summer. We know that the growers of Amber Cane have placed the sweets of the tropics in many a humble home which could not otherwise have been enjoyed. Your victories thus far should satisfy you, and yet with the true old Anglo-Saxon spirit, you thirst for more.

What a mighty revolution has your skill, intelligence, untiring industry and patience wrought in this great Northwest within the last twenty-five years! When, in 1850, I came to this State from New York, no one there believed that anything except the most hardy vegetables, such as cabbage, potatoes and turnips, could here be raised. One or two of the small grains, as oats and buckwheat, might sometimes be relied on to get through. For the rest, lumber and furs were supposed to be the only sources of industry. No fruits and flowers were ever to be seen. It was a veritable Botany Bay, to which we, who

had committed no crime, were sentenced for life. We accepted our sentence. We entered upon our several occupations. We lawyers engaged in our profession. We waited long weary days for clients. The flies did not walk into our chamber. But you, more fortunate, sought nature in her still retreats. She was coy, and long withheld her gracious gifts. But by your perseverance, by your skill and patience, you have demonstrated that Nature is no less kind in the forty-fifth parallel of latitude than in the thirtieth.

But, gentlemen, in welcoming you to this city, what have we to give in return, in comparison with what you give us? I may say almost absolutely nothing. True, we can show you half a dozen theatres running day and night—especially at night. We have churches on almost every street, with every phase of theology, and some with no theology at all [laughter]; half a dozen courts constantly running to dispense justice. Lectures on every science and subject under the sun; and musical concerts by artists who think themselves the equals of those of European fame. But all this is that for which you do not seek. And had we known in time you were to honor us with your presence here to-day we would have erected an ice palace for your delectation, the magnificence of which, as compared with that in our sister city, should have been as the splendor of the sun to the feeble light of the moon. [Laughter.]

Gentlemen, I am detaining you, you are men of business, we of theory. Indeed, it does not seem quite appropriate that a professional man should welcome those so entirely practical as yourselves to our city. But I beg you to believe that I am such, is rather my misfortune than my fault. If you will pardon me a word I will tell you how it happened. I was brought up on a farm, and was blessed, as I suppose all of us were, with poor but honest parents. My earliest infantile aspirations were to become a practical bonanza farmer, like our friend, J. J. Hill, of St. Paul, or a famous horticulturist or Amber cane grower. In pursuit of this ever present idea, at the age of ten or eleven, I discovered a scythe hanging in my father's barn, and was ambitious to demonstrate my ability as a mower. The grass was tempting in the door-yard, and I proceeded to lay it low, together with quite a number of choice shrubs and flowers which had recently been set near the grass plat. At this juncture my paternal ancestor appeared on the scene. His look was ominous, and he said, "Isaac, did you do that?" Like the immortal Washington, I could not tell a lie, especially as I had been caught in the very act. [Laughter.] I was told to go and put up the scythe. Then did the old Adam rise in my

innocent young bosom, and hurling the instrument upon an adjoining flower bed, I said: "If I cannot mow when I am a boy I wont when I am a man." It was an unfortunate remark, taken in connection with my previous work. The aforesaid paternal straightway marched me to the barn, and with the aid of a rawhide caused the chilling "snows of winter" to descend on my nether extremities, which caused them to bud and blossom as the rose [laughter], while the neighbors thought from the sound that a menagerie had broken loose. It is thus that as a child I was trained up the wrong way, which, when I become old, I did straightway "depart from it."

Gentlemen, I will detain you no longer. I trust that your stay in our city may be pleasant, your deliberations harmonious and profitable. Bidding you, on behalf of our citizens, thrice welcome, I leave you to your further duties. [Applause.]

RESPONSE TO THE ADDRESS OF WELCOME.

E. H. S. Dartt, of Owatonna, responded on behalf of the Society. He said:

Mr. President, Ladies and Gentlemen:

I can say in behalf of our Society that we are not surprised at this cordial greeting. When we have watched a man or a city and have found them pursuing a straightforward, undeviating course for a long period of time, we come to know about what to expect of them.

Minneapolis has always treated us with that kindness and consideration which we think our cause merits. In the days of our infancy, when we were struggling for existence, when we required that material aid without which great enterprises often fail, two righteous men were found in Minneapolis who rendered that aid and we lived.

Now, sir, it may not be quite right for us to claim that the finding of those two righteous men saved your city, but we know she has been saved to a period of growth and prosperity that is the marvel of all beholders, and we believe this wonderful prosperity is largely due to that spirit of liberality among her citizens that "cropped out" so conspicuously in our Horticultural fathers, Wyman Elliot and R. J. Mendenhall.

Certainly, sir, as has been intimated, we have met with great discouragements. At a very early day L. M. Ford told us we could not successfully grow the common varieties of the standard apples in Minnesota. As a Society we were then in that hopeful period of youth and our trees were in the same period, and we *sat down* on Ford, A

succession of mild winters brought such encouragement that we were able to place every croaker on the list with Ford. Thrifty young orchards sprang up, and our exhibition tables groaned under their load of luscious apples; and, though the frost king whispered "beware," and croakers thought our trees were struck with death, yet we heeded them not; a shout of victory went up and our fame as an apple-growing State extended as far as Philadelphia and New Orleans.

Alas! in the height of our glory Old Boreas assumed a more savage attitude. He breathed on us with a breath so fierce that it blighted most of our standards and sent the chills to the marrow bones of our faith. He tantalized us with the stigma of being false prophets, and all the Fords seemed to say "Amen! we told you so."

Thus humiliated, what could we do. Should we surrender? *Never*. If we seemed to falter, it was but the feint of the expert wrestler to feel our adversary and concentrate our powers for greater efforts. We will build again on a more substantial foundation, and though the completion of our structure may require a new list of varieties and a new list of laborers, yet the ultimatum of the apple question in Minnesota will be a grand success. And whilst we would profit by our adversities, we may still remember

"And though our toils are hard to bear,
We have of joys an equal share,
And less of envious strife and care, whilst here below."

To-day, a great city comes to do us honor and to strew roses in our pathway. And a generous public says, "with all thy faults we love thee still."

Now, sir, I wish I had a better tongue that I might adequately express our gratitude on this occasion. But the best that I can do is to promise that our Society shall go forward in her efforts to ameliorate the condition of mankind, not only as regards the present generation, but as regards the countless millions that are to come after us; and I promise that she will pursue these labors with a sincerity and an energy that shall do honor to her parentage and merit the continued approval of one of the best, one of the most enlightened and one of the most progressive cities on earth. [Applause.]

REPORTS FROM LOCAL SOCIETIES.

The Secretary then read the following report:

REPORT OF THE SOUTHERN MINNESOTA HORTICULTURAL SOCIETY.

To the Secretary of the Minnesota State Horticultural Society:

Before reporting the status of our present society at this place, it may be well to speak briefly of its predecessor.

The Olmsted County Horticultural Society held its last semi-annual meeting June 11, 1887, under a giant cottonwood tree, known as the "Zumbro Chief," standing on the banks of the Zumbro river, about one mile north of the city of Rochester. The tree is said to be the largest in the county, Thirty or forty people were present.

The exhibit of strawberries was probably the finest ever shown in Southern Minnesota. A. W. Sias, of this city was the largest exhibitor, showing eight varieties. F. W. Loudon, of Janesville, Wis., furnished some fine specimens of the "Jessie," one berry measuring nine inches in circumference. Several members took specimens of the "Jessie" to their homes to plant the seeds; and we may expect that Olmsted county will in the near future produce a new strawberry worthy, at least, of notice.‡

A fine photograph of the berry exhibit and of the people present, with the giant tree in the background, was furnished at a moderate figure to all who desired it. The purpose of the society is hereafter to hold its summer meetings in the vicinity of some noteworthy horticultural object lesson.

The fifteenth annual session of the society was held at the City Hall in this city, Jan. 7, 1888. Before this meeting it became impressed upon the minds of some of the members that a change was needed. For, although the society had been in existence for fifteen years, the result of its labors had been anything but satisfactory, and this seemed largely due to the fact that so few workers could be found in the county with interest enough in horticultural matters to share the burdens of carrying on the work of the society that they might enjoy the benefits of its existence.

J. S. Harris, of La Crescent, an honorary life member of the society, in a letter to President Sias, strongly urged the organization of a society with a wider field of action, and thus enlist the interest and

labors of many horticulturalists in other sections of Southern Minnesota.

Opinions concerning the new organization were also elicited from a number of other horticulturalists, including Wyman Elliot, president of the State Society, E. H. S. Dartt, of Owatonna, and J. H. Vandervort, of Mankato. Some of those opinions were adverse and some favorable. Mr. Elliot seemed to think we had better begin by building up township societies subsidiary to the county organization, and they to the State Society. Mr. Dartt was not enthusiastic but said we could count on him for membership fees, etc. Mr. Vandervort, though his letter reached us after the meeting, strongly favored the move, and said, "I am sorry I cannot attend your meeting and help organize that Southern Minnesota Horticultural Society." C. H. Pond sent us encouraging words from Kasson.

But to return to our annual meeting. Two sessions were held which occupied nearly the entire day. The attendance was not large, but those present were there for business.

After calling the meeting to order, President Sias read a letter from Jos. Klinkhammer, of Le Sueur county, on the subject of tree frauds in his county.

The subject of reorganization was then brought up, and letters from President Elliot, of Minneapolis, and J. S. Harris, of La Crescent, were read, followed by a paper from President Sias on the same subject. After some discussion by the members, the following resolution was read and unanimously adopted:

"WHEREAS, The Olmsted County Horticultural Society desires to enlarge and broaden its field of labor and to increase its usefulness by improving the condition of horticulture and kindred topics, and to collect and disseminate correct information concerning the same throughout the southern portion of our State; therefore be it

Resolved, 1. That the Olmsted County Horticultural Society take on the name and be merged in the Southern Minnesota Horticultural Society.

2. That all the property, rights, franchises, assets and liabilities of the Olmsted County Horticultural Society be, and the same hereby are, vested in and assumed by the said Southern Minnesota Horticultural Society.

3. That it shall be the purpose of the Southern Minnesota Horticultural Society to extend its labors to and secure co-operation from all the southern portion of the State of Minnesota."

A new constitution and a new set of by-laws, adapted to the use of

the society in its new field of labor, were offered, and, after some discussion, adopted by the society.

J. S. Harris, of La Crescent, though not present at the meeting, manifested his good will by contributing a paper on the subject of "Entomology." The paper was mainly devoted to a study of the Round Headed Apple Tree Borer.

A paper on "Onion Culture" was then read by Wayland Stedman, of this city, which was quite a thorough discussion of the different varieties, the best methods of cultivation, and the profits of the business.

This was followed by a paper on "Orcharding," by Edwin Deacon, also of this city; it was mainly devoted to furnishing practical suggestions to the planter, for buying, transplanting, protecting and cultivating his apple trees.

President Sias then read a letter from C. H. Pond, of Kasson, in which he related his experience in fruit growing. He has several Duchess trees, twenty-five years old, that are still healthy and bearing well. He also has some success with the Wealthy, and is quite extensively engaged in small fruit growing. He has now two acres of blackberries, mainly the Ancient Briton.

The following officers were then elected for the ensuing year:

President—A. W. Sias, Rochester.

First Vice-President—J. S. Harris, La Crescent.

Second Vice-President—C. H. Pond, Kasson.

Secretary—Edwin Deacon, Rochester.

Treasurer—Wayland Stedman, Rochester.

Librarian—Mrs. Stansbury, Rochester.

Executive Committee—William Somerville, Viola; E. G. Ballard and John Bamber, both of Rochester.

The annual fee for membership in the new society was fixed by the constitution at fifty cents, and as in the county society heretofore, each member is entitled to a copy of the State Horticultural Report, free of additional charge.

Articles of Incorporation were then adopted by the society and placed in the hands of the Executive Committee, with instructions to perfect the incorporation.

Adjourned to meet at the call of the Executive Committee. Dated, Rochester, Minn., Jan. 18, 1888.

EDWIN DEACON, *Secretary*.

The following report was prepared by President Cutler:

MCLEOD COUNTY HORTICULTURAL SOCIETY.

The second annual meeting of the McLeod County Horticultural Society was called to order by the president, Mr. Cutler, at 2 o'clock p. m., at the Methodist church.

Mr. Pearce, of Minneapolis, told how to raise strawberries. His remarks were very interesting and called out many questions from those present.

The secretary being absent, M. W. Clay was elected secretary pro tem. The reports of the secretary and treasurer were read, showing a considerable sum of money on hand, and quite a number of reports of the State Society. Reports accepted.

The election of officers resulted in most of the old officers being retained, as follows:

President—M. Cutler, Sumter.

Vice-President—J. Benjamin, Hutchinson.

Secretary and Treasurer—H. I. Corson, Glencoe.

The date of holding the annual meeting was changed to the first Tuesday in December.

A resolution was passed requesting our representative in Congress to work for a bill reducing postage on books, seeds and plants.

Very interesting papers were read on "Grape Growing," by J. S. Harris, of La Crescent, and on "Fruits and Evergreens for the Prairie," by G. W. Fuller, of Litchfield.

EVENING SESSION.

In the evening an address was made by M. Pearce, of Minneapolis, subject: "How to grow Raspberries, Blackberries and Grapes without fail," followed by questions and discussions on the same. This was followed by the president's annual address. It called attention to the increased interest which is manifested in horticulture and the promising outlook for the future.

M. T. Ridout, one of the most successful gardeners west of the Big Woods, read a very interesting paper on "Vegetable Growing."

Owing to the extreme cold weather, there was not a very large attendance at the meeting. We have obtained several new members the last season and still hope to have a live and useful society.

HUTCHINSON, MINN., Jan. 11, 1888.

We are indebted to the editor of the *Hutchinson Leader* for a copy of the very interesting address of President Cutler, which is herewith presented.—*Secretary*.

ADDRESS DELIVERED AT THE ANNUAL MEETING OF THE
MCLEOD COUNTY HORTICULTURAL SOCIETY.*[From the Hutchinson Leader.]**Fellow Members of the McLeod County Horticultural Society, Ladies and Gentlemen:*

It gives me pleasure on this second anniversary of our organization to note the increased interest that is being taken by our people in horticulture, forest planting and floriculture. From the woods of Winsted, from the prairies of Sumter and Lynn, and from the beautiful lakes north of this town—we hear of success in fruit culture. Since I commenced the cultivation of fruit for market, about seven years since, a great change has taken place. Then few berries were in our markets and it was hard work to sell the sixteen dollars' worth I had to spare. While the past season the hundred bushels I had for sale did not begin to fill the demand, and hundreds of cases were shipped from the twin cities to towns west of us. As soon as the frosts of winter are gone and our merry songsters return from the sunny South, the queen of berries, the strawberries, makes its appearance in our markets and holds the fort until about the fourth of July. It has been reported that two million boxes were received in St. Paul and Minneapolis in one season, besides the hundreds of bushels of home grown berries. Notwithstanding the great increase in production, prices were good and demand better the past season than for the two previous years. The demand for and production of other small fruits has increased in the same ratio. Mr. Latham, of Excelsior, found a ready market for his eighteen tons of grapes at fair prices. Raspberries and blackberries are being grown by the acre almost at your very doors, with as much or more certainty and a little more labor than corn. Yet how few of our people have a supply.

It is the mission of horticultural societies to show the people how to raise these most delicious of fruits, as well as to warn them of humbug and swindling tree-peddlers. Methinks if three-fourths of the money spent in this country for dead apple trees had been spent for small fruit plants and the other fourth for good horticultural books and papers, every family owning land could have plenty of fruit from its own vine and plant. The appetite for fruit is natural, and should be supplied.

Your little two-year old child is sitting at the table; on one side of his plate is a nice dish of berries and a rosy cheeked apple, on the other side a plug of tobacco. I need not tell you which it would seize and

devour with eagerness. A great change is taking place in the habits of our people. As the mobbing of Lovejoy and the hanging of John Brown presaged the downfall of slavery, so sure does the murder of Rev. Mr. Haddock presage the downfall of the liquor traffic. Already the foes of good society and happy homes are on the run and getting hard knocks from every quarter. With the decrease of the consumption of intoxicating drink, the demand for the finest of fruits is increasing. Though I am not much of a prophet, I predict that in less than two years Minnesota will have a prohibition liquor law, and that double the amount of fruit will be consumed that there is at present. What a pleasing contrast this will be to the present condition of things. To-day the father toils for a dollar and at night goes to a saloon and spends it for liquor, which places him in a condition lower than that of the lowest brute, while his wife and children are covered with rags and are suffering from hunger and cold. In the good time coming part of his hard earned dollars will be spent for fruit, another part of them for a nice lot of vegetables, his family will be well clothed and fed and his evenings spent at home and all will be happy.

This beautiful valley and the surrounding country is the natural home of several kinds of delicious fruits. Strawberries, raspberries grapes and plums are found growing wild, and we see no reason why strawberries and raspberries of largest size and finest quality and grapes equal to those of Minnetonka, which took the highest premiums at the American Pomological Society, Philadelphia, and later at the World's Fair at New Orleans, cannot be grown in abundance.

Well, there, the good wife says, it is the indifference of the men, not of the ladies, that causes such a scarcity of these luxuries. That if the women could have their way every garden and farm would have a good sized berry patch. My experience has shown me that the good wife is right. Not only your wives but your children crave these greatest of nature's blessings. I have had the old widow, bowed down with age and crippled with rheumatism so that she could scarcely walk, come many miles to see the big berries and ask for the privilege of picking a few, they looked so nice. And then when I have taken them to town to see the youngsters flock around the crates and look with longing eyes at the scarlet fruit.

I feel to-night like appealing to every man in our county who owns any land to set apart some of it for a berry patch, buy a few dozen plants of the best kinds and then care for them.

Perhaps you may say you do not know what to buy, or how to care for them. To this I will say that it is the mission of our society to

collect and disseminate this kind of knowledge, and that if you will join it and pay the nominal sum of fifty cents we will furnish you books giving instructions, showing how and what to plant and how to care for the same when planted. They give the experience of such men as Mr. Smith, of Wisconsin, who grew two hundred and seventy-three bushels of strawberries per acre last year, of Mr. Latham who had eighteen tons of grapes, of Mr. Lyon and Mr. Pearce with their acres of raspberries and strawberries, and of many other famous horticulturists.

But methinks I hear some hard-fisted old farmer, whose chief diet has been pork and beans, tobacco and hoe cake or corn dodgers, say that this berry growing is too small business for him to attend to. To such I would say that your appetite and taste is so blunted and demoralized that it might be dangerous for you to change your mode of living and occupation to that of a horticulturalist.

As we roll back the curtain of time 6,000 years or more we behold our first parents in the garden of Eden and their occupation that of caring for their vines and trees thereof. They were the first horticulturalists. I know it has been the custom for the sons of our farmers to go back on the occupation of their fathers and become doctors, lawyers, etc. But I believe the tide is turning, and we predict that the good time is soon coming when the high places now filled with lawyers and millionaires will be filled with farmers and mechanics, whose qualifications will not be measured by the size of their bank account. When the one who is following the occupation of old Adam will be the most honored in the land.

But the mission of the horticultural society is not only to encourage the growing of fine fruits, but to encourage the raising of vegetables for home and market, the planting of trees both for useful and ornamental purposes, the cultivation of flowers and ornamental shrubs, and the proper management of lawns, so as to make of our homes pleasant places in which to dwell. Surely, these are subjects worthy of the attention and support of every intelligent citizen.

But I am sorry to say that such is not the case. Horticultural enlightenment is done by a few sacrificing individuals. Our State meeting was held in St. Paul last winter, with perhaps a hundred members present. A prize fight was held in Minneapolis at the same time and it was said 8,000 men (but no ladies) gave one dollar each to see the brutal display.

At our fairs five or ten dollars is offered for the best display of fruits or vegetables (and often not paid), while some professional

horse jockey or trickster takes away two or three hundred dollars of hard cash. I can hardly believe that this condition of things is a fair indication of the taste and wishes of a majority of our citizens, and I hope we shall soon see a change for the better.

To the people of Hutchinson I wish to say, encourage the growing of fruits and vegetables in every possible way until your home wants are supplied and until a large cannery will be required to consume the surplus, and then there will be healthy and profitable employment for every man, woman and child in your village. Mankato has had a cannery for several years and you have had just as good facilities as that town.

To our farmers I wish to say, do not let our villiage friends enjoy all the good things of this world. Do a little more thinking and a little less muscle work. You are buyers and sellers, why not be business men in every sense of the word.

Following is the report of the local society in Big Stone County:

LAKESIDE HORTICULTURAL SOCIETY.

To the Secretary of the State Horticultural Society:

No specially marked progress in fruit raising in this part of the State can be reported; though our people keep trying with persistent perseverance. The great drawback is a general deficiency of forest trees to protect such plants. A goodly number of our farmers are appreciating this necessity.

The tree peddler's enactment has operated favorably here—keeping out a set of cormorants.

The members of our society are considerably scattered, rendering it quite difficult to keep up regular meetings; but it is a live working institution. Under its direct auspices a very successful Farmers' Institute was held here last November, during which sessions the claims of forestry were urged upon the people, whereby to lay the foundation of successful fruit raising.

S. Y. GORDON, JR.

Secretary Lakeside Horticultural Society.

BROWNS VALLEY, Jan. 17, 1888.

Following is the report of the secretary of the Hennepin County Horticultural Society and Market Gardeners Association:

HENNEPIN COUNTY HORTICULTURAL SOCIETY AND
MARKET GARDENERS ASSOCIATION.

S. D. Hillman, Secretary, etc.

We have about twenty active members who take some interest, although our books show a membership of fifty or more. We expect some new blood will be injected into the organization and give it more life; I hope so, at least.

At the annual meeting in December the following officers were elected:

President—M. Pearce.

Vice-President—G. H. Roberts.

Secretary and Treasurer—Prof. L. Asire.

Executive Committee—Wyman Elliot, J. S. Gray, Wm. Lyons.

Yours truly,

L. ASIRE,

Secretary.

DISCUSSION.

Col. Stevens. I want to inquire of Mr. Sias as to his success in raising the Jessie strawberry.

Mr. Sias. We have only a few plants but they made a vigorous growth. A gentleman in the adjoining county to the west of us [Dodge] has fruited it and is very successful; he has been growing it for the past three years.

Col. Stevens. If the extravagant stories told with regard to this variety are true it seems to me its merits ought to be investigated.

Mr. Sias. The Jessie is said to be a seedling of the Sharpless; its fruit is considerably larger.

Mr. Harris. I have quite a number of the plants that were set last spring and it proves to be a vigorous grower. That is the most I can say for it, so far as my experience with it is concerned as yet. I was present at the summer meeting of the Wisconsin Horticultural Society at Baraboo, and it received much praise from many of the horticulturalists of that state, the almost universal opinion being that it was a good thing and the best that they have. But this is not universal, however; there are instances where it has proved a grand failure, the same as has been the case with other new varieties that have been sent out.

Mr. Pearce. What was the opinion of Mr. Smith, the president of that society?

Mr. Harris. He says with him it has been about as great a failure any variety he ever undertook to grow. I think there were some others who pronounced upon it in the same way.

Mr. Pearce. What is Mr. Smith's location?

Mr. Harris. He has a peculiar soil, with a sort of clay sub-soil, that seems to be just moist enough for a dry season. He succeeds with strawberries better than any other man I know; in fact, I think he stands ahead of all other western men as a strawberry grower. He does not succeed well with the Jessie, on his soil. Mathew Crawford, of Ohio, speaks highly of the variety, and sees no reason why it will not maintain the reputation it has thus far attained. I do not think we ought to recommend it for setting largely nor any more than for trial, until we know more about it; that is my candid opinion.

Mr. Dartt. You think we should not take the word of those interested in their sale, as regards their value?

Mr. Harris. Some times they see things through different kinds of glasses.

Mr. Sias. I will take mine off. I find the Jessie strawberry leaves withstood the effects of the drouth splendidly, and the plants have made a fine growth. The leaves seem to be of the right color and are very thrifty; that is one reason I have great confidence in the Jessie—its capacity for withstanding drouth.

Mr. C. L. Smith. When I heard of the Jessie strawberry and the great recommendations it received from the Wisconsin Horticultural Society, I concluded to plant some of them. I got two hundred plants; they grew nicely, made as fine a growth, I think, as any other strawberry plant I ever saw. But I am not surprised that they failed with Mr. Smith, of Wisconsin. He has not succeeded with any of the rank growers and never can with his soil. He has a deep, loose, sandy soil, with an abundance of moisture, which he manures very highly; and he succeeds well with the Wilson strawberry. I am satisfied from the crops I have seen raised of the Jessie, that when planted on that kind of soil it will prove a strong grower but that it will yield little fruit. I think that is his experience. Mr. Loudon, who originated the variety, has a soil that is not as strong, that is underlaid with clay; it succeeds well there. I would not advise any man to buy strawberry plants that are scarce enough to compel one to pay the prices that are charged for this variety. I don't think any of us Minnesota growers know enough about it to recommend it. As far as my experience goes I would consider it a fair variety to try for a few years; next year we may know more about it. I presume there are hundreds of growers

in the State who will fruit it this year. We must consider the conditions under which it is grown. There are very few who have such soil as that of Mr. J. M. Smith.

Mr. Harris. Mr. President, perhaps I ought to state my position with regard to the organization of the Southern Minnesota Horticultural Society. I have traveled around some in the State and find there is an increasing interest manifested to know more of the subject of horticulture. I have asked men to join our Society and they have said they did not join because they were unable to attend our meetings. They do not realize that they could get five times the cost of becoming a member from reading our reports, and still remain at home. They do not realize the benefit of having a large membership in all sections of the State. After thinking the matter over, knowing that Olmsted county was the birthplace of the State Society, I did not see any good reason why it might not be a proper thing to have an organization for the southern or southeastern portion of the State. In my letter to the president of the society, I urged them to maintain their county organization and tried to tell them how they could help to build up this Society. I told them that we ought to have five thousand members. We might be able to get that number of names enrolled if we had more sub organizations in the State that would work to this end. I hope and trust that their new organization may prove to be a success.

I further stated in my letter to Mr. Sias that I thought the State Society ought to have a Board of Horticulture; I believe the same now. I believe we ought to have horticultural experiment stations all over the State, and that these stations should be under the charge of district and county societies. Some might argue that this plan would weaken the State Society. Gentlemen, horticulture is like a great many other things, it is "catching." If some of our country friends will turn out to the meetings of the Southern Minnesota Horticultural Society. they will become interested, and they will certainly want to attend the meetings of the State Society. I hope in the near future we may be able to hit upon some feasible plan for all the local organizations to claim a membership in this Society.

CORRESPONDENCE.

The following letter was read from President Lyon of the Michigan State Horticultural Society:

FROM MICHIGAN.

SOUTH HAVEN, MICH., Dec. 28, 1887.

S. D. Hillman, Secretary Minnesota Horticultural Society:

MY DEAR SIR: I am just in receipt of the program of your annual meeting to occur on Jan. 17-20, prox.

During my hasty visit to your city and State in August last, I saw very much to surprise me in the way of horticultural advancement; and I would gladly have extended the calls I was able to make upon yourself, President Elliot and the various objects of interest about your wonderful and thriving city. I was also very much interested in looking over the various horticultural plantations which I was able to visit; among which were the State farm near your city, the plantation of Mr. Gideon, at Excelsior; that of Mr. Luedloff, of Carver; Mr. Sias, of Rochester, and Mr. Harris, of La Crescent.

I also observed with not a little surprise the wonderful energy and courage displayed by your fruit growers in the face of the climatic calamities by which your State has been visited.

If we, in Michigan, had more of the enthusiasm which you people manifest in the face of your peculiar afflictions, we might hope to accomplish far more than has yet fallen to our lot.

The little which I have been able to see of the men and the horticulture of your State adds greatly to my interest in your doings as well as to my desire to know you and your people more intimately.

Very truly yours, T. T. LYON.

FROM CHAS. W. GARFIELD.

SECRETARY'S OFFICE, GRAND RAPIDS, MICH.

Dec. 21, 1887

Dear Secretary Hillman:

Your favor received, and I hasten to say that it will be impossible

for me to make any further engagements than those in Wisconsin. I would like so very much to meet you and your Society, but time and strength are limited; and I, in a moment of rashness, agreed to spend ten days in Wisconsin, following January 10th.

Sincerely yours, GARFIELD.

FROM WISCONSIN.

JANESVILLE, WIS., Jan. 14, 1888.

Friends of Minnesota Horticultural Society:

I should have been glad to have met with you this winter. Our committee appointed our corresponding secretary, A. S. Hatch, delegate, who will extend to you our society's greeting for this "open winter."

Hoping your horticultural work will keep step to the music of 40° below zero, and yet prove the varieties that will pay you abundantly.

I remain truly yours,

GEO. J. KELLOGG.

P. S. Enclosed find my youngest daughter's first horticultural essay—competing for one of your prizes.

G. J. K.

FROM NEW YORK.

ROCHESTER, N. Y., Dec. 30, 1887.

S. D. Hillman, Secretary, etc.:

The announcement of the meeting of the Minnesota State Horticultural Society, Jan. 17, 18, 19 and 20, with program, is at hand.

It will be a pleasure if you will forward such accounts of the meeting as may be published at the time in the daily Minneapolis papers, with any additional notes you may think best. From these I can make a fair account for publication. It is always interesting to hear from your wide awake Society.

Yours very respectfully,

C. W. SELLYE,

Editor Vick's Magazine.

FROM TEXAS.

DALLAS, TEXAS, Dec. 30, 1887.

S. D. Hillman, Secretary, etc.:

DEAR SIR: Your kind invitation and letter received.

Thanks for the former, and in reply to the latter, beg to say our State report is not out yet. When out will comply with your request. I am doing all I can to get same out. Will you send a delegation to California to the national convention of the American Horticultural Society? We send you programs of our last state and local meetings.

Yours truly, MRS. J. R. JOHNSON,
Secretary Texas State Horticultural Society.

FROM WASHINGTON.

U. S. DEPARTMENT OF AGRICULTURE, }
 WASHINGTON, D. C., Nov. 29, 1887. }

S. D. Hillman, Secretary, etc.:

DEAR SIR: This year I again submit for your consideration another schedule, which is but slightly changed from that of last year. You will see that according to it, it is desirable that your Society hold its annual meetings on the first Tuesday after the fourth Monday in January of each year. The only reason for this, is the fact of the collision in the meetings of your State and Iowa, unless some such arrangement is made permanently. There are special reasons, as we all well know, why this should not occur—because of the intimate relations of their respective members, and because of climatic conditions of similar character. Please present this matter at your next annual meeting.

Yours fraternally,

H. E. VAN DEMAN.

I recommend the adoption of the following:

SCHEDULE FOR ANNUAL MEETINGS OF STATE HORTICULTURAL SOCIETIES.

First Wednesday in December (annual meetings), Michigan, Dakota, Missouri; second Wednesday in December, Ohio; second Tuesday in December, Illinois; third Tuesday in December, Kansas and Kentucky; first Tuesday after first Monday in January, Indiana and Colorado; first Tuesday after second Monday in January, Nebraska; first Tuesday after third Monday in January, Iowa and Pennsylvania;

first Tuesday after fourth Monday in January, Minnesota and Western New York; first Tuesday after first Monday in February, Wisconsin; first Tuesday after second Monday in February, Michigan.

The following from Com. Van Deman was also read:

GENEVA, KAS., Dec. 23, 1887.

S. D. Hillman, Secretary, etc.:

MY DEAR SIR; Your letter of December 5th, has followed me here, where I am spending a few days with my family after a visit to some of the western states on official matters.

I will write to the secretary of the Iowa Horticultural Society asking if they can take the date proposed for your State. But they have so long held that position that it may be hard to get them to do so. In the mean time will you not endeavor to have your Society leave the matter in such shape that you can change if Iowa does not?

I would gladly send you something to present at your next meeting if it were possible, but owing to extreme pressure on my time, getting out special reports or bulletins in addition to other regular work, that it will be almost out of the question. However, I will *try*, but hardly expect to reach it in time for your meeting. I will soon return to Washington where you can always address me.

One of the bulletins I mention will be of interest to you in the Northwest, and will be sent to all your members without further notice, as I have their names upon my list.

Yours, fraternally, H. E. VAN DEMAN,
Pomologist to U. S. Department of Agriculture.

FROM R. L. COTTERELL.

DOVER, OLMSTED Co., Dec 29, 1887.

S. D. Hillman, Secretary, etc.:

I thank you for this notice. I should feel a great pleasure in attending your meetings, as I feel as much interest as usual, but remember I am getting old, and it is rather severe weather, or I would like to meet old familiar friends.

I should be very much obliged should you furnish me with any of the proceedings of the Society; it will be esteemed a great favor by

Yours very truly,

R. L. COTTERELL.

President Elliot here stated that Mr. Cotterell was an honorary

member of the Society and one of the original twelve who assisted in its organization.

FROM PROF. OESTLUND, OF THE STATE UNIVERSITY.

MINNEAPOLIS, MINN., Jan. 3, 1888.

S. D. Hillman, Secretary, etc. :

DEAR SIR: Yours of December 28th, at hand. I will be pleased to make use of the time you have given me to address the Horticultural Society on the subject of Entomology. I will not have any special reports this year that will require cuts.

In my last report I asked members of the Society to send me specimens of any insect that was found to be injurious or on which any information would be wanted, and I would then look up the subject and report at the annual meeting. But during the year I have not heard a word from any of the members, and have not had time to undertake any special work on insects injurious to the horticulturist.

The subject of entomology is not recognized as it ought to be in our State, and we all need to be a little wakened up if we could get the right man to present the subject before us. I am glad to do what I can, but this is not much.

During the summer I have used most of my time in collecting our insects along the western border of the State and in finishing my report on the plant lice of Minnesota; a copy of which I take pleasure to mail you.

Yours truly,

O. W. OESTLUND.

FROM DAKOTA.

RAMSEY, McCOOK Co., DAKOTA, July 2, 1887.

S. D. Hillman, Secretary, etc. :

MY DEAR SIR: The Report for 1887 has come to hand, and the reading of it has been the comfort of many a leisure hour. I think of the old Society every time I go into my garden. There I am reminded of its influence, and for what little I have there that is better than the average farmer's garden contains, and for all the benefit and pleasure I derive from the garden in any respect, I feel an obligation to the Society for giving me the horticultural bent of mind and holding me to it till it became second nature.

Say to Mr. Harris, when you meet him, that I appreciate and thank him for the motion to make me an honorary life member.

You asked me once to furnish my photograph for the picture gallery. I have no spare copy suitable, and it is uncertain when, if ever, I may get out where a new one could be taken. Meantime, I wish you would look into the State Fair buildings for a large photograph I left there in September, 1885, in frame, showing a group of the State and Territorial commissioners at the World's Exposition in New Orleans. If it is still there, ask Secretary Hoard to let you have it. In the group my friends will recognize what was left of me after my Washington illness. It is the best I can do for you at present. Let me know if you find it. I left it hanging on a panel of the fish exhibit. It was designed as a present to Gov. Hubbard, and I asked him to send for it, after the fair of that year was over, but I presume he never thought of it afterwards.

Why is Andrew Peterson left out of the list of life members? He was elected on my motion at the same time with Charles Luedloff. It is one of my pleasant memories that I discovered these two grand old men out there in Carver county and brought them and their works before the Society, and enlisted them for life as active members. It strengthens my courage in apple growing to know that Mr. Peterson's surviving Russian trees—strays from the East plain, sifted out of the Washington importation, as Prof. Budd called them—have continued ever since, the same hardy look as when they greeted my prophetic soul in August, 1883, when I found them, searching as I was, not alone for apples to get the medal with at Philadelphia, but for things new and improving, for the Horticultural Society. It was the first time I had ever seen a fair test of the Russian trees—all else had been top-worked on crabs; and the first time, also, that I had seen an apple tree in Minnesota that said plainly in every expression of leaf and wood that it had come to stay. These trees must now be from twelve to fourteen years old—no test for a single seedling, having its own top root under it, but for a group of root grafted trees, a pretty good one. If, as Prof. Budd avers, others of the East plain Russians, having equal adaptation to our Northwestern climate, are in addition good in quality for eating out of hand, we are nearer success in orcharding than by the seedling route; though to one traveling either from the Russian starting point or any other starting point, "happy may be his dole," I say.

As to my own Russian trees—apple, pear, cherry and plum—planted last year, about one hundred and twenty-five in number as before re-

ported, the most of them wintered well. They made a good deal better showing when new growth commenced this spring than my Duchess and Wealthy, most of which I had to cut back; more, I think, on account of insufficient growth in our dry season of '86, than from any other fault. I have added about fifty more Russians to my orchard, all from Prof. Budd and, in the fall, will try to give you a statement of their appearance then. They are all making a thrifty growth this year.

We have had a poor season here to test new varieties of strawberries—too dry till picking season was over. None of mine have proven satisfactory. Their growth for next year is now well started by heavy rains, and I will give them another trial before reporting on them by name.

A garden item: Early last fall I emptied my whole barn yard upon the garden, covering the ground out of sight and pretty deep. This spring as soon as dry enough, I burned the manure all off—at least the strawy, fibrous part, before ploughing. Have scarcely seen a cut worm. Things are growing like Jack's bean, and the vegetables are of a tender, succulent quality, quite unusual. Peas and potatoes planted April 15th—the William Hurst pea was ready for the table June 10th; the Champion of England, June 30th, and Early Rose potatoes, June 22d.

Wild fruits abundant with us this season, especially gooseberries, grapes, plums and choke cherries.

With best wishes for your continued prosperity,

I am, yours truly, OLIVER GIBBS, JR.

SUPPLEMENTARY.

Dec. 3, 1887.

Continuing the garden report and completing the season, I find of the four varieties of watermelons planted—Excelsior, Iron Clad, Mountain Sweet and Stokes—the latter, although very sweet as reported last year, inclining to toughness, and shall reject it. The Iron Clad I would only plant for variety to exhibit at fairs. It furnishes the largest specimens, and is very showy, but its quality is inferior. The Mountain Sweet is always good and averages large. But I would always plant the Excelsior, and if but one sort, it would be this. It is the earliest of the lot with me; yields abundantly—no small ones and many that weigh thirty to forty pounds, and is of luscious quality and always tender. Rind thin, flesh of a deep, rich pink. I showed ten of the Excelsior at our county fair, September 22d,

weighing three hundred and fifty pounds. Largest Iron Clad in that collection weighed thirty-seven pounds; but one stolen from same vine that would have gone to fifty pounds. A new variety appeared among my vines which had the shape of the Mountain Sweet, color a mixture between that of the Excelsior and Stokes; size, a medium, between Mountain Sweet and Stokes, and quality, texture and color of flesh a combination of all three at their very best, with smallish seeds, like the Stokes, but larger. If I can fix the type by replanting it will be a lovely melon for home use.

I planted the same muskmelons as reported on last year—Miller's Cream Nutmeg and Bird Cantaloupe. The Miller is perfection for home use, but cracks at the stem as soon as fit to use, and will not answer for market. The Bird cantaloupe shows this year a cross with the Miller, bringing up its quality to a high grade, retaining its firmness and soundness for handling, and losing about one-third in size. This type I hope to fix by replanting.

The market for melons was always ready at Madison at about a cent a pound by the wagon load for well-grown lots. I sent in several loads, all I could get in without neglecting the farm harvest; but the best pay I got for the labor in raising my melons was by calling in the neighbors for six miles around one pleasant day in September and having a melon pic-nic. Half a ton of melons disappeared in the afternoon, and just before sundown our guests opened their lunch baskets and spread an excellent pic-nic suppe. for us on tables laid on the blue grass lawn in front of the house. I reckon some missionary work was done in the melon cause by the distribution of the pic-nic seeds; and I presume some of my guests will beat me out of my premiums at the county fair next year.

In tomatoes this year I had the Beauty in addition to Livingston's older sorts, the Perfection and the Favorite—all first class every way, but the Beauty averaged larger than the others, and I prefer its color—that of the Acme. The whole crop was late in ripening, and after marketing about twenty bushels of ripe tomatoes, I tried the experiment of using the green ones for cow feed. I found the cows would eat them with good relish, taking half a bushel at a ration; and offering them to my horses, they, too, pronounced them good and wholesome. I fed them for a month from the garden, the frost holding off till the latter part of October, and then putting about fifty bushels in the basement of my barn, used them up before decay set in. To gather them cheaply I pulled up the vines by the roots, let them wilt two days, and then shook the tomatoes off and picked them up as we would potatoes.

Recurring to small fruits, I expect to be able to make a good report next year on strawberries, as my Crescents, which I neglected to mention in last report, and my Glendales, Sharpless, Warrens, Parry's, Black Defiance and Triumphe De Glondes have all made a luxuriant growth, and the Jewell a few strong plants.

In the orchard, everthing that got a fair start in last year's dry season, has done well this summer, and the rest that were cut back last spring have made good new stems, the ground froze up dry about a week ago, but not deep, till we got two snow falls, each of about four inches, in quick succession—the last very damp, so as to prevent drifting, and both will probably melt and go into the ground before we have any hard freezes. The additional Russians sent me by Prof. Budd last spring, apple, pear, cherry and plum, together with some trees of the Wolf native plum of Iowa, said to be a freestone similar to the Weaver, but darker in color, and larger, have all made a vigorous growth.

Speaking of native plums, I have a lot of letters of inquiry and asking for seeds and cions, as a result of my report on my plum grower at your last annual meeting. It is annoying, for only now and then a correspondent sends stamps for a reply, and I am too busy with my own affairs to attend to their requests, and not being in the trade have no facilities to pack for mail or shipment. If your experimental stations want to try them, I shall be happy to furnish small lots to each, if your Society will let me refer to them and will undertake redistribution when enough cions are grown. The crop this year was very abundant on nearly all the trees outside of the cattle pasture, and the surplus sold at sight by the load at Madison at two dollars per bushel. As a hint to others, I will mention here, that the market at the same time was overstocked with half ripened, poorly handled plums from the Big Sioux and the gulches in this vicinity at one dollar per bushel; but mine were left on the trees till ripe and in full color, handled carefully, crated in Beecher baskets—a lot that I have had on hand for fifteen years in continuous use—and carried to town in a spring wagon. We shook them off upon a soft carpet of grass without injury, as the space under the trees was kept mown like a lawn and all rough or sharp things kept grubbed out or picked up for this purpose. I would never cultivate the native plum, but keep the ground in grass and fertilize by top dressing when necessary. This to prevent suckers from severed roots. No new sorts worthy of mention found this season, although previous favorable impressions are sustained and increased by second testing of many sorts. We find

several sorts that have so little acidity as to make a very palatable plum butter with but a moderate amount of sugar, and these are nearly all freestones; but the best plum yet tested for canning is the large wild Damson spoken of in last report. I found this year scores of young trees of this variety scattered all about my woods, in bearing, identical in every way with the parent tree, showing that it reproduces itself exactly from seed, although surrounded everywhere with bloom of other sorts. The best plum to eat out of hand is a small, cherry-red freestone, bearing enormously and medium late, and holding on well against the wind. This is a cross from older trees standing near—one sort a big, dark red, perfectly sweet and solid-meated cling, and the other a large, light red cling, of good sub acid quality. This tree has borne heavily for two years in succession. The best plum for all purposes is the one I mentioned last winter for its remarkable beauty of color and finish. I speak of this now in order to mention a singular fact. It is the only plum on my grounds that is seriously interfered with by the birds, although my woods are full of all the birds of the North. They puncture every plum of this variety as soon as it is ripe. Is it because of its striking beauty? Certainly there are other plums in the vicinity at the same season of ripening good enough in quality. Next year I must cover at least one tree of this sort or lay and watch to discover what bird does the mischief. I shall not pass sentence of death in advance, like Jephtha of old, for it may be some favorite songster. I suspect the turtle-dove, and might find it the sly brown thrush, a bird I love and for which I would plant a plum orchard if he could not live with me without, in memory of one little pet of this species that summered and wintered with me at Lake City with the freedom of the premises, coming to the window to be fed and to his perch in the house at nightfall—bathing in the snow winters, and in the chicken drinking-pan summers—boss of the poultry yard, keeping the fowls off the house porch, and companion of my garden work in quest of all worms turned up—victim at last to the marauding cat of a neighbor.

If I am too prolix, cut me down; but I am reminded here of many little things of interest to me—possibly to others. My best bird fruit is the choke cherry. They take every one—bushels and bushels in all, but what a scattering they make of the pits, and what myriads of young trees coming up everywhere outside the cultivated fields. I am obliged to make war on the choke cherry trees in some of my gulches to keep down the black knot and prevent its spreading to the plum trees; but for all that, it is a lovely tree, either in blossom or fruit,

and a good companion for the wild tree rose which seems to seek out this tree, pushing its stalks up among the cherry branches on the shady banks, and hanging out its bright red blooms resting on the cherry leaves, six to eight feet from the ground, in pleasing contrast to the dark green of the cherry and offering the illusion of rose blooms growing from the cherry.

The next best bird fruit is the wild gooseberry, which is as abundant here as the hazel in Minnesota, and yielding in great abundance a large smooth fruit, in good demand in the market either green or ripe. A drove of a hundred turkeys subsisted almost entirely upon them while green, and when ripe the little wild birds leisurely harvested what there was left. None of my birds interfered with the garden strawberries last summer.

I think Mr. Brand was too severe on the sand cherry in his remarks last winter. I have seen it in full bearing this year. It occupies no more space than a currant bush, and bears an enormous crop of black, glossy cherries about the size of the Janesville grapes. It is not a fruit to eat out of hand, having a little of the acid flavor of the choke cherry, but this disappears in cooking; and it is so hardy and so prolific, and so handsome, and so useful for pies, cherry butter, canned fruit and jelly, as reported by my neighbors who grow it, that I would certainly recommend it for trial. If "so disposed," as Mrs. Gamp would say, I would undertake to educate the fruit market of any town near me to take the sand cherries in large quantities.

I have not yet seen a Dakota-grown apple in this county, and only a few crabs; and none of the nurserymen's native plums, except a single plate of De Sotas shown at our county fair. But I hear that in Turner and Clay, the two next counties south, there were a good many fine apples raised. I did not attend the Territorial fair at Mitchell, being laid up at home with sundry ills the flesh is heir to. But I am going up to Huron the thirteenth to meet with the Horticultural Society, and may then inflict on you another supplement.

A word about the roses and other flowers and I am done. We brought with us from Lake City and planted out in the spring of '86, of the roses, our favorite damask--name unknown--the Plantier, the white Scotch, the yellow Harrison, the old-fashioned Blush; the Boursault climber and three kinds of moss roses, whose names are not known. All these gave us handsome blooms last summer--the Boursault having two hundred and eighty-five from one root. How is this for only one year's growth after transplanting; and so much better is our soil than where we used to grow the roses, that there is a marked

increase of size and brilliancy of the blooms. We planted last spring a double set of Salzers "Diamond Four," the Jacquiminot, the La France, the Coquette des Alps and the Capt. Christy—the latter the favorite rose of Mr. Bancroft, the historian, out of five hundred sorts, as his gardener at Washington once told me. All have made a good growth, and the La France and the Coquette put out a few nice blooms the latter part of the summer. We lay down and cover all our roses with sod spaded from the grass near by; and shall uncover the Diamond Four in the spring with some anxiety for their life; but Salzer says they will stand out doors. I cannot report in detail our annual flowers except that there was an abundance of the common favorites and some of the new sorts, and that they looked pretty and smelt nice, and were in much request among our guests and picnic parties, and somehow one carries nothing more agreeable to a friend in town than a nice bouquet. Their names, at least the newer sorts, are not known only to the superintendent of that department, who uses my envelope too freely to save the seeds and write their stuck-up names on, and crams the drawers and pigeon holes of my desk with the packages. But I get acquainted with the perennials. The one year's growth that rewarded us with rose blooms on the roots we brought from the old garden, also brought out the flowering of the lilacs, the grandiflora, the spireas, the nigalias, the clematis, the nisterias and the peonas, and here also reminding us of the kindness of our soil. The buffalo berry, *Argentea Sheperdu*, I found growing in my pasture and transplanted half a dozen small trees to the garden last year. It is a dainty little ornamental tree, in all respects—form of tree, leaves, blossoms and fruits. It holds its leaves undimmed by frost till the last hard freeze-up just as winter sets in.

But this report is too lengthy. Slash it till it fits into the program and the time allotted to other things.

Would be glad to attend your annual meeting; but although I amuse myself a little in horticulture, the farm business is my employment, even in winter, and obliges me to keep closely at home, at least not to go far away. Have not set foot in a railroad car since November, '85, when we came here. But don't weep for me on that account. It had come to be a relief not to be obliged to ride on them or go anywhere away from home, for that matter--and is so still. G.

The next on the program was a paper by Mr. Dartt.

Mr. Dartt. Mr. President, I was invited to prepare a paper upon experimental stations, their scope and usefulness, as I understood it; I think those were the words of the Secretary; and I wrote in reply that I would try and do so, but when I came to get the program I found it was a different thing. I found he had made the task a great deal harder there than at the first. As you all know, it is an easy matter for one to talk at random about a thing, but when you are pinned right down to the thing itself, it is a great deal more difficult. I am trying to run an experimental station at Owatonna and I look to this Society for instruction. It would be presumption on my part to expect to be able, or to undertake to educate the Society; it would be entirely wrong. So I have written according to the first heading, which gives me a chance to talk at random. I do this knowing that fools can ask questions that wise men are puzzled to answer. And I know, too, that the principle comes in that it is easy to prate at the Bunker Hill monument but not easy to build one. I would a great deal rather prate at experimental stations than come down here and try to instruct you how to run a horticultural experiment station. With this explanation I will read my random remarks:

EXPERIMENT STATIONS: THEIR SCOPE AND USEFULNESS.

By E. H. S. Dartt, Owatonna.

Mr. President, Ladies and Gentlemen:

In considering this subject, our main object should be to determine in what way, we can secure the greatest permanent benefits, in the shortest time and at the least expense. And the first question may be in what line of experiment may we reasonably expect to secure these permanent public benefits? Not in the line of small fruits for our experimenter would hardly have time to explode one boom before another would be on and he would have to settle down to the business of chasing humbugs which would be comparatively useless on account of their rapid flight and transitory nature. In regard to flowers and vegetables they seem to be on a paying basis, and need few baits from the public crib. In farm products we favor experiments, but to do most good they should be so simplified that the average farmer can comprehend and comply with the conditions.

It is quite important to know what breeds of farm stock are best, but the difference is not so great as our fancy stock breeders would have us believe, or as to require extensive experiment. We know that the "swill pail hog" and the "meal and bran cows" are excellent

breeds, and the best seed corn we ever tried was the Richfield. We grew about one hundred and sixty bushels of ears of dent corn to the acre.

For our greatest benefits from experiment we must look in those lines where it can change partial or total failure to success. If certain breeds of cattle were exempt from cattle diseases, and certain breeds of hogs were exempt from hog cholera, then the question of breeds would become of vast importance, but such does not seem to be the case. Then where shall we look for such conditions. This points directly to our glorious hobby, fruit, forest and ornamental trees. Here in our different varieties and climatic influences we have all the gradations from total failure to eminent success, and I firmly believe that no line of experiment can be followed with such assurance of beneficial results to the present and future generations. For, what would the world be without trees? And what must the condition of our part of it soon become unless tree planting shall receive a greater impetus? Now, whilst we seem to have found tricks in all trades but ours, some of the other fellows say our hobby is the biggest humbug out, and that experimenting at public expense is useless for the reason that it absorbs vast sums of money without adequate returns. Their error seems to arise from the fact that the money goes out in round sums, so many thousands of dollars which anybody can comprehend, whilst the beneficial results are so scattered and far-reaching that it requires a penetrating mind to see and comprehend their vast importance. And even then, great benefits may result without becoming perceptible at all.

Suppose the wheat experiments at our central station should enable our farmers to increase their yield only one per cent or four quarts to the acre. If they realized this, they might say it is a small matter and it don't pay to run these high-toned institutions. Still these benefits might be continuous and cumulative, and if figured for one year would amount to over \$200,000, enough to establish and run an experiment station for many years. Again, suppose a man, by improved methods should increase the profits of his farm ten or twenty per cent he would not know where to place the credit. Evidently most of it would be due to his own good sense and energy, but without agricultural papers, farmers' institutes and experiment stations, he would still be plodding on in his old ways.

Many farmers believe that the interest taken in their welfare is prompted by purely selfish motives—that they are favored like fattening animals that they may afford better pickings for those who prey

upon the industries of the world. And that our country is largely controlled by rings and combinations whose policy it is to tax every industry just as much as its degree of prosperity will warrant, and that if their prosperity as a class should be increased it would be followed by increased exactions.

In this view of the case it does not seem strange that they do not take kindly to the teachings of men brought in from the trades or professions to teach them how to manage the farm.

Experiments, to satisfy this class, must be managed in each leading department by a man of practical experience and in whom the people have confidence, and they must be on a scale of sufficient magnitude and surrounded by such circumstances as will make them fair and practicable tests. Too much science is not admissible in the common walks of life.

If these conditions are not secured as approximated, it will not be strange if some of our farmers should shout humbug! and if some of the more modest professors should think about the pearls and the swine.

There is probably no branch of business where the old theory of every man to his trade comes in with more force than in conducting experiments of whatever nature. An obscure poet has said:

"Take the wisest man that ever drew the pen,
Or raised his voice to be heard by men,
He'll tell of things taught in his school,
But if you go beyond, he too's a fool."

Now, sir, we think we discover a great deal of the far beyond in conducting varied experiments, for if precedents are found they can seldom be applied on account of a change of surroundings. The word experiment implies the exploration of new fields, and these fields when entered will be found so expansive as to afford ample room for the best efforts of your best man, though he be philosopher and sage. If he jumps at conclusions, he will frequently stumble, and if he carefully feels his way, his progress will be so slow as to require from a reasonable public the exercise of those commendable virtues, patience and charity.

DISCUSSION.

Mr. Pearce. Mr. President, I am not in favor so much of what are called experiment stations as fruit and tree stations. There are stations where men will experiment as a business, and after their experiments have been made the results have been established beyond a

shadow of doubt. My view is this, that we as a Society should not put out anything at a station but what we have tested ourselves. We should be able to describe the variety of tree and to give the number that failed to grow. Each man in charge of a station should have a duty to perform and he should be governed by that duty. Our experiments ought to be such as would warrant success. Now, I take it that after I have experimented on certain things I ought to be able to say, do thus and so and you will get a crop. I am in favor of fruit and forestry stations where we can put our trees and say that we know they will grow. That is the general view I take of it. An experimenter is an expert and he has got to use his experience. His experience is used, it becomes developed and established with regard to any variety, and then anybody can grow it. When Columbus broke the egg and made it stand alone, anybody could do it.

Mr. Sias. I consider this paper of Mr. Dartt's a very valuable one and I would like to hear it fully discussed. I believe that there are several other papers to be read upon this subject and I suggest whether it would not be better to hear those and have them all discussed at one time; certainly there should be a full discussion on the matter of experiment stations.

Mr. Dartt. Mr. President, I agree with Mr. Sias in regard to the propriety of delaying discussion until the other reports are in.

Mr. Harris. The reports from experiment stations come in the last day. I am very much in favor of experiment stations. Experience is a dear school, but it is one in which we can learn something. I believe we ought to have an experiment station in every county in the State of Minnesota, and that those stations in a certain measure ought to be under the control of the State Horticultural Society. I am speaking of horticultural experiment stations. We ought to have men in charge of these stations who have the capacity to manage them. For instance, we might have one man to conduct experiments upon one line, and another in another department. One man may succeed in growing seedling apples, another in small fruit; while here and there we may find a man who has the ability to conduct experiments successfully along the whole line.

The field for experiment in this State is a very broad one. It is well known that we have met with a series of reverses in our endeavors to grow the apple; to-day we dare not stand out and say to the world that we can grow the apple successfully here. But by testing Russian varieties and new seedlings, and planting the seeds of these Russian varieties and of the best seedlings and crossing them, we may hope in

time to secure varieties that will be adapted to our wants in every portion of our State. We want to conduct our experiments with a view to get apples that will last us the year round, as we must recognize that fruit has become an absolute necessity. It is necessary to have fruit upon our tables, and if there is a lack in this direction we are living very poorly:

We have the native plum growing in our State and in Dakota, and as far north as the Red River of the North, and some varieties of the plum are very choice fruit. It seems to me that our experimenters ought to collect together the best varieties that can be found in these northern regions and raise seedlings from them to get the best and distribute the products so that every farmer throughout the State and in Dakota may know that they can grow the native plum in great abundance and varieties that are choice in quality. If we follow up the improvement of any one kind of fruit properly it can be so improved as to be fit for use in our kitchens and upon our tables.

One of the most important things for experimenting upon is forestry. We want to test the question whether our native trees that are growing in our forests in Minnesota, are better adapted for use than trees that are brought here from Europe; to find out the best methods of culture and planting; to determine which will furnish the cheapest and best fuel, and afford material for lumber and shelter-belts, in the very shortest space of time. These and other questions could be brought out by experiments at these stations. I hope this Society will encourage the work to be done at such stations and that we can have them located where such experiments may be carried on, and if they are properly conducted I will guarantee that they will not only be of service but that we shall receive much benefit from them.

President Elliot. I do not think we had better continue this discussion at this time, but take up some of the unfinished correspondence. We have a question box and anyone that desires can prepare a question to be brought before the meeting at the close of every session, when if there is time a few minutes can be given to discussion of whatever the subject may be.

FROM COMMISSIONER COLMAN.

S. D. Hillman, Secretary, etc. :

DEAR SIR: This section is collecting material for a report on apple

scab, and it is desirable that information concerning the extent of the injuries occasioned by the disease be obtained from your State.

You will greatly aid this section in this work by answering, as far as you are able, the following questions:

I. What is a fair estimate of the annual loss occasioned by the disease in your State?

II. What varieties are subject to the attacks of the disease?

III. What varieties are comparatively free from the attacks of the scab?

IV. Does the character of the soil or atmospheric conditions in any way influence the spread of the disease?

V. Do you know of any remedies that have been used with success?

Hoping that you will favor the section with the desired information,
I remain, respectfully,

NORMAN J. COLMAN,
Commissioner.

DISCUSSION.

Mr. Brand. Mr. President, I will say that while I was in the South I met the Rebel General French, and in conversation with him he stated that when he was a boy they were troubled with the scab in the State of Virginia; that in his father's orchard they tried the experiment of boring a hole in the body of the apple tree, put in a quantity of sulphur and then plugged up the hole; that for years afterwards the tree was never troubled with scab.

Mr. Harris. If he had put the sulphur under the tree it would have been still more beneficial.

Mr. Dartt. I would like to know, Mr. President, if there has been any instance of apple scab known in this State?

Mr. Harris. I have seen it on one or two seedlings and observed it in my orchard the summer before last on my Strawberry crab.

Mr. Dartt. I think I have seen it on apples that were brought in from other states.

President Elliot. For the information of some of the members it might be well for you to explain what it is.

Mr. Dartt. I don't think I can.

Mr. Harris. It forms upon the fruit and takes a growth which spreads if it is very bad until the apple will get as much out of shape as those that are effected by the curculio. It has a vigorous growth, but I have not seen it in this State far enough developed to cause cracking

of the fruit, but enough to effect the shape of the apple. In conditions where the trees are very much confined for want of circulation of the air there is more of the disease manifest.

Mr. Brand. I would like to add a word to this talk in regard to experimental stations, and I would like to say now that it is the duty of this Society to instruct Commissioner Colman (if he does not know his duty,) that is just what he is there for, to try and explain different things that prove destructive to various crops and to find out remedies for the same.

Mr. Pearce. That is just what he is doing.

Mr. Brand. The benefit is for the whole people and the government should pay the expense of ascertaining these facts.

Mr. Dartt. Mr. President, I would say that I received a circular from Mr. Colman asking the number of fruit trees and the number of acres I had in cultivation, stating that the information was wanted with a view of putting himself in communication with the fruit growers of the country, for the purpose of getting information from them.

President Elliot here introduced Mr. J. S. B. Thompson, of Grundy Center, Iowa, as a delegate from the Iowa Horticultural Society.

On motion of Mr. Stevens Mr. Thompson was made an honorary member of the Society.

REMARKS OF MR. THOMPSON.

Mr. Thompson. Mr. President, and fellow horticulturists: I return to you my sincere thanks for the honor you have conferred upon me, in permitting me, as a representative of the State of Iowa, to mingle with you in your discussions at this meeting. I hope and trust that the knowledge we gain in this manner may be of mutual benefit.

There seems to be a little question in dispute here in regard to the blight of the apple. In Missouri it has effected the fruit very much; it is caused by the buffalo midge stinging the fruit. In this State and in Iowa, it is injured by the stinging ant; perhaps some of you have run into a covey of them; I don't know whether they bite or sting, but they hurt most awfully when they get after a person. I noticed a swarm of these ants in a young orchard and they almost ruined one-third of the fruit on one tree. I was working around there and made up my mind to have a row with them. I went to the house and got some torches and soon drove them out. I noticed that the fruit they stung would wither and the apple would grow out of shape. When first stung it expands in growth and afterwards there is a dark,

brown speck, forming into a knot, as the fruit grows; when you come to remove it by peeling the apple you will have to cut a quarter of an inch deep in taking it out.

In Missouri they have the midge and the scale louse; the same thing is noticed in California. The disease is described at length in a work which I have here. I hold in my hand a report from the Department of Agriculture, by Mr. Colman and also by Mr. Van Deman. It contains the report of the agricultural department, that of the chemist, the statician, entomologist, etc. It appears from the report there have been at least one hundred and fifty different experiments made on the California fruits, and some are recorded here as to fruit in Missouri. They have tried experiments with soap and kerosene, soap and whale oil, etc.

Mr. Harris. Carbolic acid is also used.

Mr. Thompson. I think it is, but there are more than one hundred and fifty experiments mentioned. I received this book about three weeks ago, and it is worth a twenty-dollar gold piece to any man who is growing fruit, I don't care who he is, if he will read it and practice by it. This information is gathered up from different localities and is printed here.

In regard to these experimental stations I think that every man ought to make himself an independent experimenter. What will grow on that brother's farm there might not grow on mine, or on this other brother's. The soil has a great deal to do with the growth of trees as well as climate, but both have their effect. I presume there is not a gentleman in the room that would read the chemist's report in this book that would believe that the life propensities or the sources of life of the different trees, derive their sustenance and nourishment for the growth and life of the tree, from chemical action. If you were to see the chemical analyzation of even the Ben Davis apple you would hardly believe it; I didn't believe it myself. I read it over twice and finally made up my mind that it was like the Bible, meant to be believed and I would believe it.

I am trying experiments all the while. I find it helps me, and these experiments have proved a benefit to several of my neighbors, also. The experiments I have made in a seedling orchard have been worth hundreds of dollars in our State. The experiments you have been making in this State have also been of great value.

This report here states that already the Wealthy apple, which was originated by Mr. Gideon, of this county, is becoming a leading apple for export, from Canada and Vermont; and this is a credit to your

State, as well as to the originator of the apple, Mr. Gideon. The Peter and the Gideon are also valuable varieties. What we need is a few more such apples as the Wealthy, that are long keepers; and we hope that Mr. Gideon, or some other Northwestern man, will give us the desired fruit.

There is a lesson here that we all can profit by. My advice is, for every man to plant all the good seeds from all the good apples that come in your way. It is an old saying and a true one, that one seed of an apple will give a corresponding apple of the parent; the others may be better or they may be inferior. I know the kind of seeds that I have planted in my orchard, in Grundy county, and I know I had one hundred and seventeen different varieties at the Storey County fair one year—distinct varieties. Many of them were very choice apples; some were very poor. I have some kinds on which I have taken five or six state premiums, in Iowa. By my experimenting in this way it has been the means of enlisting several of my neighbor farmers in the growing of seedlings down there. I have been growing them for the last ten years. I believe if those present would plant seeds of our native seedling trees, crossed and fertilized with our best Russian varieties that we would succeed in a few years in producing the very best apple which can be grown anywhere, and that we would soon place apples within the reach of every farmer of this Northwestern country.

In this book there are over fifty varieties of apples mentioned. While I am talking, there is one new fruit mentioned of a seedling of an unknown parentage, originating, I think, in South Carolina, which is said to be devoid of either blossom, seed or core; it is said to be a very good apple, keeping till April and May, in its own climate. It is something I never read of before, but it is in print here and I suppose it must be true. It is a sweet apple, of deep, orange yellow, and the season is claimed to be from April to May; an unknown seedling. How true it is, I would rather say after seeing the apple.

This seems to be an instance where a new variety of apple has been originated by the planting of seeds, originating a variety destitute of seeds, and nature having done the balance.

If this Society will adopt the plan of establishing experimental stations and will take some of its best men, who will give their time, or who will work at their leisure at experimenting in a practical way, you will find it of advantage and you will be improved by it—the whole of you.

Mr. Harris. These reports of the Department of Agriculture are

very valuable, and I think the majority of the people who receive them from their members of Congress do not appreciate them properly; but every horticulturist ought to have the last one and just as many of other numbers as he can get. Probably Commissioner Colman would send a copy to anyone who would write for them. Members of Congress can mail them to people who would appreciate them and to whom they would be useful. I would recommend that members of our Society write to their members of Congress and request that a copy of the last report be sent to them and as many as can be had of the back numbers, and they will be sent to them free of charge.

Mr. Thompson. I think there were seven or eight thousand copies printed for general distribution.

President Elliot here announced that anyone on payment of a dollar became a member of the Society and entitled to copies of our report, bound in cloth.

On motion of Col. Stevens the meeting was adjourned till 7 o'clock P. M.

----- EVENING SESSION.

TUESDAY, JANUARY 17, 1888.

The meeting was called to order at 7 o'clock, P. M., by Vice-President Sias, who stated the first thing in order upon the program for the evening, was the delivery of the President's Annual Address.

PRESIDENT'S ANNUAL ADDRESS.

Members of the Minnesota State Horticultural Society, Ladies and Gentlemen :

We have come together once more to take up the horticultural resume of the year's work, and draw from it some conclusions worthy of consideration for our instruction. The vicissitudes of the year have been manifold and exhibited in various ways. With all of us the year has not been full of unbounding contentment, joy and happiness. Dame Nature has at times seen fit to cast many a threatening frown upon our thoughts, deeds and actions. Some have been blessed with prosperity, happiness and good fortune, while others have been overwhelmed with affliction and reverses. Sometimes we have been on the mountain top in our aspirations for worldly gain and horticultural fame, at others deep down in the valley of gloomy discouragement and depression. The experiences of the past where they have been profitable and instructive should be treasured in our minds and

reviewed as we meet to greet each other in friendly discussion for improvement; for here it is we brush away the cobwebs from our minds, obtained by recluseness from the world, and receive new impulses, thoughts and conceptions of the possibilities and impossibilities of this labor of love to which so many of us have devoted our time, money and attention in trying to develop something that will be of use to future generations.

We come here this evening to take a retrospective view of the work of the past year and try to discern wherein it has been successful, and, if possible, the cause of our failures. Here we should be willing to discuss freely what have been our plans of operation, that we may develop or impart information concerning the progress attained, or describe new methods adopted in conducting our particular industry. If we have made failures, it is here we should be willing to discuss them, and, if possible, discover their causes. If we have been successful in producing something better than our neighbors, it is here we should try to impart that knowledge for the improvement of the whole; unless we believe in that trite but true saying, "It is always safe to learn, even from our enemies—seldom safe to instruct even our friends." As a rule our greatest ambition should be to place the knowledge we possess in the cultivation and management of our different crops at the disposal of all, then we shall be giving and receiving; this will be improvement in the right direction. Our new theories, new methods, new experiments are of little value to the world at large unless we are willing to have broad gauge ideas and spread them far and wide, imparting freely to each other what we have discovered that will be of value to mankind.

It is a true saying that those can direct best who can do best; and those can do best in any department of work who begin early in life, and learn by first impressions and experience much that can be learned in no other way. If this be true, we should endeavor to awaken an enthusiasm for the performance of horticultural duties at a very early age in the minds of the rising generation. This, it seems to me, is an important move towards solving this problem of profitable fruit raising.

The thought forcibly impresses us of the amount of time and energy that have been wasted by not understanding fully the relation or dependence of one part of the work upon another. Correct principles and ideas should be instilled into our minds at the beginning of our education, or we shall sooner or later be on the wrong road to success. A very dull scholar is he who cannot learn some new truth

from experience. Benjamin Franklin said: "Experience keeps a dear school, but fools will learn in no other." The school of experience to many of us has been a very dear one, and want of system has been to many nearly as expensive. There is nothing that I regret more than the habit I have fallen into of doing my work in an unsystematic way; the older I grow, the more I see the necessity of having some fixed purpose in all classes of work, and systematic rules to follow.

Every young person should be taught that there should be a place for everything and everything in its place; also that there should be a rule established for doing all classes of work, and it should be done according to the rule as near as possible. It is the unsystematic way we have of going through life that causes us so much waste of time and so many of our failures.

This is not all; many of us have acquired the habit of using up a great amount of time unprofitably. There is a quotation like this: "As every thread of gold is valuable, so is every minute of time." Idleness is the thief of time, and if we should make use of each moment with the mind directed to some particular object, how much more would we accomplish. Show me a man that has methodical, systematic ways of doing everything with which he is connected, and he is invariably a successful business man in whatever industry he may be engaged.

RETROSPECTIVE.

Twenty-one years ago the thirtieth of the present month this Society held its first annual winter meeting at Faribault; a little band in numbers, but devoted in purpose; and the few remaining that came to the front on that occasion and enlisted for the war, have never since let their interest in the good cause diminish, but have ever been persistent, faithful workers, untiring in their devotion, standing shoulder to shoulder, battling against the elements to make successful an industry capable of giving us employment, sustenance and gratification to the better impulses of our minds and added refinement to our homes. This band of persistent workers little thought of the reverses they would be called upon to meet or the discouragements to endure, and if they have had doubts and fears to overcome they have never showed signs of being disheartened, but have ever kept their faces to the front; if their labors were arduous they redoubled their efforts to make a success out of defeat. If their doubts developed into fear they have never murmured. If they have

increased in the minds of the people a desire or ambition to press forward this work of horticulture they so nobly begun, they feel well repaid for the toil of mind and body they have endured. As the saying now is, we are of age, and like the young men of our country we are now able to take on new responsibilities, new ambitions, new hopes, new desires. In looking back over the records of our past history we find, as in all other classes of business, many becoming discouraged have dropped out, but those remaining are devoted workers, wishing to perpetuate the same unselfish desire in those coming after; and it is to be hoped that whoever take upon themselves the burdens and responsibilities of aiding and sustaining the correct principles of horticulture in coming years, will bring more intelligent minds, as devoted hearts and as willing hands to help develop an industry that had its beginning in the Garden of Eden, and will ever continue to fascinate and attract the attention of mankind as long as the dews of Heaven fall, causing the earth to produce trees and plants to bud and bloom.

FAILURES.

Failure is an ever present factor that attends nearly every industry of any magnitude. The failures in trade in the United States in 1887 have averaged one to every one hundred and eleven persons in business; while the failures with those in horticultural pursuits I think have been less, yet there are more than there should be.

The reasons for our failures are not at first apparent, but on seeking after the known or unknown facts the true causes are developed; but then, as the saying is, "It is too late to lock the door after the horse is stolen." To obviate the possibilities of failure each enterprise should be scrutinized with care, caution and sagacity. Many times it is the want of a true system arranged in regular subordination to a well developed plan to be guided by a mind stored with knowledge based on practical and scientific principles for governing all our actions.

Our experiences in producing apples, pears and cherries have to a large extent been discouraging; now is there not a good reason for so many partial and total failures? When we consider the methods used in handling, planting, care and cultivation of fruit trees, I sometimes wonder that we have shown any good results. Still there are many places in the State where apple trees are yielding a proper remuneration or return for time and money expended. Many of our failures have come through lack of thoroughness in all our experi-

ments, in developing this class of fruits in a climate like ours. If our standard of success with the apple has not been high, we have great reason for encouragement in the successful cultivation of all kinds of small fruits where we have planted them judiciously with proper surrounding elements.

There is hardly any place so bleak but where some varieties of the small fruits will thrive and produce profitable crops when planted and cared for with intelligence, unless in some few exceptional cases under peculiar circumstances.

MARKET SUPPLY AND DEMAND.

Within the last decade great alterations have been produced for improving the business methods relative to increasing the facilities for handling and distributing large quantities of horticultural products expeditiously. Now, one of the first things to be considered is how a market can be obtained for produce, and how production can be limited to the capacities of the market.

A few years ago our market gardeners held back in extending improvements, for fear of overstocking the market. Sales were slow, prices low, much that they raised was necessarily disposed of at a great sacrifice. New manure and machinery, together with greater intelligence in the use of fertilizers and management of sowing, cultivating, harvesting and marketing their products has served to revolutionize the whole system of market gardening, and create new relations with producer and consumer regarding supply and demand, that are alike beneficial to both. In this business as in every other, the more system introduced in the carrying of it on the better the chances will be of success; and if all used the same enterprise and judgment in their operations their expenses would be reduced, their profits increased, and a general prosperity prevail.

It always has been and always will be these enterprising, persistent men, who never fail in producing first-class products, and obtaining good, remunerative prices, that come to the front, prosper and are happy; and it remains for the shilly-shally laggard who always has poor, unshapen vegetables and fruits to sell to do the grumbling about poor markets and low prices. I have heard it said by gardeners: "If it were not for these commission men that are shipping in such large quantities of fruit and vegetables, we could dispose of more produce at better prices." Now those men do not stop to think what an important factor the commission or middle man is, or to consider if it were not for their tact, push and energy our markets would be much more

irregular in supply and prices; short at one time and overstocked at another. They are the great distributors and equalizers or balancing power that governs supply and demand, the market gardener's best support.

FORESTRY.

I do not wish to forestall the Forestry Committee's reports, only to add emphasis to what they may say with regard to the adopting of some definite plans for accomplishing what seems to be of necessity for the well-being of those interested in horticultural and agricultural pursuits. The subject of forestry is becoming of so much importance to the people of every State and Territory that it is attracting a portion of their attention which it so justly deserves. There should be some scheme devised for the reservation and protection of large areas of timber to the west and northwest of this point, to serve for the specific purpose of protection from storms of wind which sweep over this portion of the country with so much fury and cause such great loss of life and property. The ameliorating influences of this large belt of timber on our climate at this point is known to be very great; the thermometer here ranging several degrees higher in winter and lower in summer than west of the big woods. If such are the facts, that alone would be a good argument in favor of this scheme. Unless some measure is taken soon to preserve it for wind breaks and other uses, we shall have the dreaded cyclone sweeping through our streets and beautiful parks, laying waste our shade trees and dwellings. The acquiring now of large tracts of these fine timber lands, if protected and cared for properly, would have a tendency to increase in value the adjoining portions of the State; also it would be a good financial scheme as rendering future aid and assistance to many other kinds of industry. Many are urging reasons for experimental stations to be instituted to aid in growing tree seedlings for distribution to those desiring to grow timber. This is well enough, but better than this is to enact laws for the preservation and protection of the forests we now have, that have been planted by an indulgent Creator and so beautifully cared for by an all-wise Protector, until wasteful man took possession. I would therefore recommend that the committee investigate and suitably consider this great question of so vital importance to the prosperity and happiness of the future generations, and draft resolutions to be presented to the Society expressive of our desires and wishes on this question of forest preservation and protection, before adjournment.

It is said: "The fool and squanderer march along, heedless of the coming disaster; the wise man acts in time to prevent it."

NEW VARIETIES.

Those seeking to introduce new varieties of fruits or vegetables should exercise great care and judgment that none are sent out except those of fixed character and value. Too many of us are solicitous for our new varieties, when it would be much better for us to cling to the old, tried sorts; and we often do not stop to consider when we have produced a new seedling tree, fruit or vegetable, whether it possesses fine qualities of acknowledged superiority, better than some kinds now in cultivation, but send it forth for public favor regardless of its hardiness, productiveness, quality, size, shape, color or texture, thinking it will come into prominence if we boom it with glaring advertisements. Until a variety has been thoroughly tested and found possessing many good qualities, equal to or better than those already in the market, it should be considered with temerity. We, as horticulturalists, should adopt a conservative policy in regard to buying high-priced varieties. Many of us have bought our experience, sometimes dearly, and we should hoist the red flag of warning to caution new members and amateurs in the business. Until new varieties have been tested at a number of our experiment stations, we, as members of the Minnesota State Horticultural Society, should be cautious in recommending their sale or distribution.

HORTICULTURAL INSTITUTE WORK.

The special act of the legislature that created the Farmers' Institute also gave the president of your Society a voice and vote in its organization, electing of superintendent and supervision of his work; and as your servant, entrusted with this responsibility, I have tried to exercise my best judgment, and act for the best interests of the Horticultural Society. If I have erred in the performance of these duties it has been the fault of the head, and not of the heart, for I have always felt that what was for your interest should take precedent in each and every action that demanded special, intelligent, thoughtful consideration in a broad-gauged, unbiased policy.

I have taken some pains to keep posted in regard to the class of instruction that was being given at the various institutes in the interest of horticulture and the manner of its presentation, and I have to report that we have not as yet been able to place such teachers in the

field at all times as the exigencies of the situation demanded, and the instruction in our particular interests has come far short of meeting the expectations of many of our members, and those most deeply interested in the success of this class of work. The Farmers' Institute I consider one of the best mediums, when rightly conducted, for the dissemination of practical horticultural information among our farming population. In selecting and sending out those who are successful experts in their particular class of industry, it should be our highest aim to send out such instructors as are not bigoted and have no scheme to push for their own selfish ends outside of giving horticultural instruction, and unless we can find such instructors I think we should hesitate before recommending any one for this position. I do not wish to be understood as casting any reflections, but simply to guard against any contingency of this kind in the future. We must carefully consider the qualifications of our horticultural lecturers and feel sure they are worthy of the places they hold; if not our claim to the position of an intelligent, progressive horticultural society may be justly criticised.

OWATONNA EXPERIMENT STATION.

The Owatonna Experiment Station, created by special act at the last session of the legislature, has been started on the State School Farm under the care of E. H. S. Dartt, superintendent. Our Society has been honored in the selecting as superintendent of this station one of our members who has been long identified with the horticultural interests of the State, and whose experience in the past will help him very materially in deciding what to plant, as well as what not to plant. The task, allotted to him, to develop a practical, profitable, instructive example of object teaching to those children that will come in daily contact with his work, I hope will impress him with the great responsibility that rests upon him; and ample means should be provided for carrying on the experiments in such a way as will tend to store these young minds with knowledge that in after years will help them and us to solve the great problem of successful fruit culture in this State.

I regret to report to you its beginning under adverse circumstances. The policy pursued by our legislature in not making available an appropriation to carry on an enterprise that is fraught with so much of benefit to the minds of those children dependent upon the State for support and education seems narrow. The supporters of this measure

have done everything possible to advance the work and put it in shape to forward the purpose for which the station was created.

EXCELSIOR STATION.

Now that the experiment station at Excelsior is about to be abandoned, would it not be best to transfer such stock as Supt. Dartt may think best to his station? I would also suggest that a committee be appointed to confer with Prof. Porter, and through him with the Board of Regents, as to whether the one thousand dollars designed for the Excelsior station could not be transferred to pay expenses at the Owatonna station. If such an arrangement could be effected it would place that station in a position to go on and undertake valuable experiments at once.

TREE PEDDLERS.

The law that was passed at the last session of the legislature to prevent the practice of fraud by tree-peddlers and commission men in the sale of nursery stock was watched very close by those anxious to hinder or prevent its passage if possible; and from the amount of letters of inquiry received, and the criticism this new departure has occasioned from very many of the nurserymen south and east of us, privately and in their Nurserymen's Association meeting held last June, we are led to believe that some of their agents have given warning to their principals that the people of this State are taking means for the protection of those horticulturally inclined, who are annually being defrauded by deceitful impositions in the sale of nursery stock. This may be a new revelation to the principals, and I wish I could honestly believe that such was the case. The law considers employer and employed alike responsible, and a business that has to constantly employ fraudulent means in the sales and distribution of its products to make a success is in a pitiful condition, and should be looked upon with disgust and aversion.

The inquiry into the means established to throw some restraining influence upon the methods pursued in the sale and distribution of nursery stock should very properly come before this meeting for a fair and impartial consideration. That the law has its defects and is not perfect is apparent, but complaints of swindling and fraud, by tree agents, have been less the past season than at any previous time for several years, which proves it beneficial and a decided progress in the right direction. We hope the experience of the past year may teach

us a better method to be used in the future to prevent our people being defrauded and help elevate the nurseryman's standard of honesty.

REFRIGERATION.

There is a new process of refrigeration about to be introduced into this State that has many valuable points of excellence. It possesses all the qualities for preserving meats, vegetables, fruits, flowers, food and drinks of all kinds in great perfection, in a very simple and effective manner. Its intensity of cold can be regulated from 40° above to 80° below as easily as you can turn on your city water or gas, simply by turning a stop-cock to regulate the amount of flow of material used for freezing from the reservoir through a coil of pipes within the refrigerator, where it condenses and collects in a similar tank or receiver placed at the other side, which material can be redistilled without loss and sent out again on its round of duty. It is said to be much cheaper than ice, and to give a much better atmosphere for preserving perishable goods from decay. This process will be invaluable to the market gardners, fruit producers and dealers, on account of the possibility of lengthening the season. By it we can have apples that are now late fall, in perfect condition in April and May, and those we consider as winter apples the next midsummer and fall. By this process we may have the choicest varieties of fruits much beyond their usual season.

AMERICAN POMOLOGICAL SOCIETY.

The twenty-first session of the American Pomological Society was held in Boston, Mass, commencing Wednesday, September 19th, and continuing three days. Our Society was not represented by a delegate as we were needed at home to assist at our State Fair then in session. This has been a very unfruitful year in nearly every section of our State, and with the exception of grapes all the show fruits were unproductive, and it would have been impossible to make a creditable exhibition. The society made a wise choice in selecting as president Mr. P. J. Berkmans, a man of liberal views and with experience in horticulture. It may justly be said that the society honored itself, pomology, and the man, when they elected him to succeed the lamented Marshall Pinkey Wilder, who served that organization so long and faithfully.

ORNITHOLOGY.

I wish to call your attention to that friendless bird the English

sparrow, *Passes Domesticas*. Scientific research into the character and disposition of this untamed annihilator of horticulture and agriculture has developed some very startling facts that call for your immediate attention. If the following synopsis of the report, which was prepared by C. Hart Merriam, of the United States Department of Agriculture, be true, the friends should become alarmed at the sad havoc this foreign importation is causing among our friends, the native birds of America. The report says:

"The English sparrow is a hardy, prolific and aggressive bird, possessed of much intelligence and more than ordinary cunning. It was first brought into this country in the fall of 1850. It is domestic and gregarious in habit, and takes advantage of the protection afforded by proximity to man, thus escaping nearly all the enemies which check the abundance of our native birds. Its fecundity is amazing. In the latitude of New York and southward it hatches, as a rule, five or six broods in a season, with from four to six in a brood. Assuming the average annual product of a single pair to be twenty-four young, of which half are females and half males, and assuming further that all live, together with their off-spring, it will be seen that in ten years the progeny of a single pair would be 275,716,983,698. In the year 1886 the English sparrow was found to have established itself in thirty-five states and five territories. In the United States the total area occupied at the close of the year 1886 is 885,000 square miles; in Canada it is not quite 148,000 square miles; in all 1,033,000 square miles. In the United States alone it has spread during the past fifteen years at the average rate of 59,000 square miles per year, and in the United States and Canada together at the rate of 69,000 square miles per year. Of all the native birds which habitually make their homes near the abodes of man, the martin is the only species which is liable to hold its own against the sparrows, and numerous instances are on record where even the martin has been beaten and forced to abandon its former nesting place by these beligerent aliens. The birds which have suffered most from the English sparrow are the robin, catbird, wren, song-sparrow, chipping-sparrow, yellow-bird, oriole, vireo, and phoebe. Not only does the sparrow drive away and sometimes kill the adult birds, but when it finds their nests it throws out their eggs and young, and not infrequently feasts upon them."

WHAT THE SPARROWS DESTROY.

The sparrows cause a positive and direct loss to our agricultural

industries, amounting in the aggregate to not less than several millions of dollars per annum. Indeed, it is safe to say that it now exerts a more marked effect upon the agricultural interests of this country than any other species of bird; and its unprecedented increase and spread, taken in connection with the extent of its ravages in certain districts, may be regarded with grave apprehension. In the early spring it prevents the growth of a vast quantity of fruit by eating the germs from the fruit buds of the trees, bushes and vines, of which the peach, pear, plum, cherry, apple, apricot, currant and grape suffer most. Lettuce, peas, beets, cabbages, radishes and cauliflowers are attacked in turn, and devoured as soon as they show their heads above the ground, and in many cases the seed is taken out of the earth before it has germinated. The grape industry is also a heavy sufferer from the ravages of these pests. At the end of the season of 1886 bitter complaints of damages done the grape crop by sparrows had reached the department from twenty-five States and the District of Columbia, as follows: Alabama, Arkansas, California, Connecticut, District of Columbia, Georgia, Illinois, Indiana, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Mississippi, New Jersey, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Vermont, Virginia and West Virginia. Its consumption and waste of corn, wheat, rye, oats, barley and buckwheat, in many parts of the country is enormous. It feeds upon the kernel when it is in the soft, milky state, as well as when it has matured and hardened, and in fields of ripe grain it scatters upon the ground even more than it consumes.

In addition to the disfigurement of buildings by the nests and excrement of the sparrows, and the injury to ornamental trees and shrubs resulting from the same cause, it should be mentioned that they frequently damage and sometimes destroy the ivy and woodbine covering the walls of churches and other edifices. The destructive habits of the English sparrow in Bermuda, Cuba, Germany, Austria, Russia, India, Egypt and Australia are too well known to require more than a passing observation. In England alone the damage it causes has been estimated at not less than \$3,850,000 per annum, and in Australia the loss is much greater. It threatens to become a more baneful pest to the American farmer and the horticulturist than the grasshopper, caterpillar and Colorado beetle.

The report further suggests that legislative action be taken to stop any protection at present afforded the English sparrow; to authorize killing it; the destruction of its nests and young; and to protect the

outcher, sparrow hawk, screech owl, the birds which feed largely upon the sparrows, and the appointment of one or more persons in every town to officially take measures for their destruction.

The report also suggests several means by which they can be exterminated, among them being by firearms, tearing down their nests by an iron rod or hook, and driving them from their roosts by turning a stream of water upon them. In this connection it should not be forgotten that the English sparrow is an excellent article of food, equalling many of the smaller game birds.

IN CONCLUSION.

Every member of our Society, for the attachment they entertain for it, should feel a personal desire to promote its welfare at all times and places. They should employ their best ability, ideas, desires and ambitions to contribute to its advancement, and help adjust the many perplexing difficulties to be overcome. Every opportunity should be improved for establishing in the mind of some man, woman or child the love or desire of becoming proficient in the art of cultivating beautiful flowers that shall please with their perfume the delicate sense of smell, or delicious fruits exciting enjoyment to their cultivated palates, or splendid trees that shall impart a pleasant shade from the noonday sun and give shelter to their declining years. With each, neglect of this should leave a feeling of duty unperformed. Sometimes a look or word of inquiry may be the means of exciting interest or creating desires for developing some beautiful feature for pleasure or use that will unfold and illustrate some fundamental truth over which we have spent much time.

The æsthetic studies in horticulture are each day disclosing to the inquiring mind some very valuable examples worthy of our closest attention, and as we seek to solve its many vexatious problems we begin to comprehend how intricate are her processes and little our knowledge of the governing laws of nature. "Tall oaks from little acorns grow," so we must develop step by step, year by year more practical methods of obtaining information from each and every source attainable to make more perfect a system of rules serving to assist us in performing with greater dexterity the duties devolving upon us as men and women who have assumed the pleasing responsibilities of solving a few of the concealed mysteries that excite our curiosity when we try to develop fruits, flowers and vegetables in their greatest perfection, adapted to a climate as variable as ours.

1. Grub up all your extravagant customs and revolutionize your habits, that the law of your being, a kind of second nature which grows within you, may be radically changed.

2. Break up the soil that covers your dormant brain, and eradicate all the old weeds of dissatisfaction, and begin anew a more advanced class of cultivation.

3. Fertilize your minds with ambition, greater aspirations, and desire for larger usefulness.

4. Sow the seeds of prosperity, success and good fortune by adopting the truism of one of America's most noted men: "He that by the plough would thrive, himself must either hold or drive."

5. Cultivate special attention and study of the three virtues, Faith, Hope and Charity, with a view to valuable returns as payment for your industry.

6. Prune off the unnecessary sap suckers of wastefulness and prodigality that rob your business, steal your resources and bring want and failure in place of success and prosperity.

7. Cut away your needless indulgences, vices and faults, things not needed in the every-day life of sensible fruit, flower and vegetable raisers.

8. Reap a harvest of happiness in the felicity of elevated perceptions and blessedness from the pursuit of social and benevolent affection, and the promised bliss of the great hereafter when remembrance of failures, discouragements and losses will cease.

9. Market unbounded charity and good will towards those who cheat and defraud the innocent, inexperienced, upright amateurs in horticultural pursuits.

And finally, brother co-workers, when we go hence to our homes and occupations, do not hide the zeal and enthusiasm here acquired, but go forth with fixed purposes of faithfulness, persistency and devotion to the cause we maintain and the principles we espouse.

The reading of the address of President Elliot was received with applause and marked approval.

On motion of Mr. Gould, a committee of three was appointed upon the recommendations of the President, as follows: G. W. Fuller, J. S. Harris and A. W. Latham.

President Elliot stated that, owing to the illness of Mr. Stubbs, who was to prepare a paper on grape growing, he was not able to be present to read the paper, but it would appear at the proper place in the report.

GRAPE GROWING.

By N. J. Stubbs, Long Lake.

I do not consider there is any great secret or mystery about growing grapes. and it seems to me it is fully time that everyone who owns a portion of "God's acre" should realize this, and not longer neglect the planting and rearing of this luscious fruit.

Grapes have ever been the constant companion of man from the earliest dawn of civilization to the present time.

The vine is likewise the emblem of peace and prosperity, always adding much to the comforts of home life.

Stamped on the memory of childhood are recollections of pleasures that in our declining years we love to recall with joy and delight.

If you have concluded to plant one vine, or a thousand, in either case select the warmest spot you can find, for heat is pre-eminently essential to make success of this fruit. This is generally to be found in this country on somewhat elevated land, near a body of water, the land inclining to the south or southeast, with a goodly share of sand mixed with top soil to attract and hold the heat of the sun. Such a location, with a clay subsoil mixed with limestone, will prove very satisfactory for growing grapes.

Select good, strong, two-year-old vines, grown from cuttings, six or eight inches long, so you can be able to plant at least one foot deep, to avoid winter freezing and summer drouth, for undoubtedly many failures here in the Northwest can be traced to roots grown from single eyes and shallow planting.

Clean your ground thoroughly of all impediments that would in any way retard the cultivation of the soil among the vines. Work the ground well to the depth of one foot or eighteen inches. Harrow and mark off the rows eight feet apart each way. Some varieties of grapes that are slow growers would do closer than this, but this distance is best for most varieties. The best plan is to use a trellis and cultivate crosswise of the hill, or rolling ground, to prevent washing of the soil by rains. The first year after planting keep the ground well cultivated, leaving the vines to grow unchecked in the fall; cut back to two buds. The second summer we select the strongest and best buds and train to a stake, set well in the ground, unchecked as before, except to pinch all laterals off above the first leaf. If our work has been well done thus far, we have laid the foundation of our vineyard. In relation to the manner or system of training and pruning the vine, it would be folly, perhaps, for us to designate any particular one as

being the best, as circumstances and conditions may exist when any particular system would be "more honored in the breach than in the observance." But whatever system is adopted, the third season brings around the time when it is necessary to erect the trellis, which we make by setting posts of tamarac or oak, six feet two inches long, sixteen feet apart in the row, and two feet deep, leaving them about fifty inches high. To these posts attach four strands of galvanized No. 12 wire, one foot between each strand; fasten the wire to post with small staples, bracing the end posts well to keep the wires taut. Having the trellis completed, it would be well to consider a few important principles before we can proceed intelligently to train and prune the vine:

First—As a general rule, the fruit-bearing canes at this stage are grown from buds on the previous year's canes, or in other words, the wood of this year contains the buds which produce fruitful canes of next year.

Second—That *fruit* buds differ from *wood* buds only because of better development.

Third—That a cluster is a fruitful tendril, and that the ordinary capacity of a fruitful bud is to develop on an average three of these fruitful tendrils; although I have seen on the Eumelan and Elvira as many as five of these fruit bunches, or clusters.

Fourth—That it is an easy matter to overtax a young vine by leaving more fruit on it than it is capable of ripening without damage. A young vine cannot yield the crop that an old one may, any more than a young person can perform the labor of an adult.

Fifth—It is of the utmost importance, if we wish to insure health and long life to the vine, to keep the foliage, fruit and roots well balanced, for the relations of all parts are closely related and are constantly acting and reacting on each other, quite as readily as do the mind, body and brain of a living organism.

In fall pruning, cut the fruit-bearing canes so they will not reach more than half way to the top of the trellis. As the vines awaken from their winter's sleep in the spring, and the buds begin to swell and burst forth, it will be observed that two buds often appear from what seemed but one in the dormant state. The first and simplest operation, in summer pruning, is to rub off one of these buds, and all superfluous ones wherever and whenever they appear; a simple touch of the finger is sufficient. The weakest and lowest ones must go. If these shoots have grown a foot or more the necessity of removal is greater, and this must not be neglected.

At times it may require a good deal of courage to destroy so many prospective clusters of fruit, therefore it is better to do it early.

The remaining shoots are pinched off at one or two leaves beyond the last cluster of fruit, and all laterals are stopped in the same way as fast as they appear. These bearing canes and laterals, after recovering from the check thus given, will soon recover and make a fresh start in wood making, when the pinching process is repeated as before, leaving an additional leaf each time. The effect of this treatment is to retard the sap and retain it where it is most needed for the full development of buds, leaves and fruit. The leaves remaining are thus increased in size much beyond their natural proportions, which undoubtedly adds to the vitality of the vine, its power to resist disease, also at the same time increasing the size of the fruit and giving it a finer flavor. This close pinching process also results in full, well-developed fruit buds on the canes to be left for next year's fruiting.

Some advocates of long pruning claim that the third and fourth buds on a cane produce the best clusters, while others contend that the auxillary buds, those that emerge at the junction of the young and old canes, will never produce fruit. But it will be observed that very much depends on the treatment the vines have received. If they have been allowed to grow at random and to take care of themselves, we will admit the vines will seldom fruit, purely from lack of development, the sap being allowed to pursue its natural course unmolested; it has no time to stop to develop buds. With judicious summer pruning these base buds are equal to the emergency. In fact, the short spur-system depends absolutely for success on this summer pruning.

For our climate, where it is absolutely necessary to protect vines during winter by laying down and covering with earth, in order to secure a crop, the spur-system is probably the most successful, all things considered.

The following paper was then read by Mr. Sias:

THE TREE PEDDLER.

By A. W. Sias, Rochester.

Mr. President and Gentlemen of the State Horticultural Society:

"When you see him coming, call back your dogs; don't slam the door in his face, for you *may* entertain an angel unawares." These

true words were spoken many years ago before this Society by the late Dr. P. A. Jewell, whose eloquent words always carried weight, and commanded marked respect and close attention. Mr. Jewell was a "gentleman and a scholar." He had no haughty words of contempt for any poor mortal who peddled for a livelihood, whether on foot, or with a cart, providing he carried on an honest business. What we understand to be a "Tree Peddler" in Minnesota is a man who takes a load of trees on a wagon, or some other conveyance, most invariably from some home nursery, of hardy, well grown plants, and he carries these trees among farmers, who dare not order, owing to having been swindled so often, shows them just what he has got, and usually sells as low as the same stock could be purchased at the nursery. Now I am not aware that I ever peddled a tree in my life—but think I have known men in the business, as stated above, that were as honest and reliable as any man I ever dealt with. But is it not just *larely possible* that I was expected to speak of a very *distant* related animal species, known as the "Tree Dealer?" Please to excuse me for introducing an entirely new subject under the head of the "Tree Peddler." Now this animal usually known as the "Southern Tree Dealer," is in such marked contrast with the tree peddler that there is no danger of mistaking one for the other, no more than there is of mistaking a clod-hopper for a dude. You may also entertain a regiment of Southern Tree Dealers without the slightest danger of entertaining an angel unawares. And as President Elliot said in his annual address a year ago, "many of them have more cheek than a government mule." A friend living less than a mile from my place kindly handed me the following bill of plants last week that he purchased of one of the aforesaid tree dealers last spring, more than half of which are now dead:

4 Russian Mulberry.....	\$4 00
2 Rhododendrons	4 00
2 Paul's New Flowering Thorn.....	2 00
2 Camperdown Elm.....	4 00
2 Unknown shrubs.....	2 00
2 Cut Leaved Birch.....	4 00
	<hr/>
	\$20 00

There are two Scotch varieties of weeping elms, the Camperdown and Scampston. But what a scamp a man must be to charge two dollars for a small elm tree. Such a man should be made to scamper down and out, in a hurry.

Our new law to protect planters against fraud by tree peddlers and dealers is in no sense a nurseryman's invention. While a very limited number spoke against the gross frauds that were continually being practised upon the farmers, I am not aware that a single nurseryman helped to put the law into its present shape. I think they would prefer free trade with Canada and all other countries, and very much regret that the robbery of the "tree dealer" should have been the cause of such a partial and restrictive law.

I wrote President Patten, of Iowa, if this law would work any injury to horticultural pursuits in Iowa, and he replied: "Yes, it cripples small nursery establishments all over the northern half of Iowa, and lets in the big bugs who can put up the bonds, and drives honest competition out of your State, and allows those who can sell at home an excuse, and a reasonable one, too, for asking bigger prices for their stock. The law was thoroughly canvassed at the last National Nurserymen's Convention, at Chicago, and thought by a large majority of the most intelligent men there to be a clear infringement of the inter-state commerce law; and there is no doubt but that if a suit was brought under your law, that an association of nurserymen would conduct it, and they believe it would be declared unconstitutional. They regard it as substantially so decided in a decision by the United States supreme court, made in Tennessee last fall. Such legislation will never be tolerated in this country."

E. De Bell, president Dakota Horticultural Society, writes under date of December 29th: "In regard to the Minnesota tree law, the only objection that might be urged against it is its discrimination against nurserymen outside the State of Minnesota. Yet if each State had a similar law it might be called an offset. Nursery firms with large capital are able to give bonds for a large number of agents, while the poor (because honest) nurseryman is excluded. I do not know of any way by which this can be avoided. On the whole I think the law a most excellent one for Minnesota, but hard on Dakota, until we get a similar one, which we shall endeavor to do." Whether the law is constitutional or not I am unable to say. There is a question whether or not any State has the right to discriminate in any legitimate business in favor of residents of its own state as against those of other states. A nurseryman in Wisconsin mentions as one of the good results of our law restricting "tree dealers," that the better class of agents formerly working for "hefty" firms further East and South, whose nurseries were as extensive as the poor man's pasture (viz., the whole length of the highway), and existed only on paper—he says

they are leaving these thin concerns and seeking nurseries further West. Men who want or are compelled to do an honest business, and submit to your law. "I wish to know the meaning and intent of the law. Are you obliged, in case you want to buy a currant or strawberry plant outside of your State, to take out the \$2,000 bonds? If so, it will seriously interfere with the local trade, and throw it into the hands of the large firms at such prices as they may see fit to ask, shutting out competition from other States."

Another letter from one of the foremost horticulturists of Wisconsin, or the Northwest, either, writes: "I do wish I was lawyer enough to tell you about that law against tree peddlers, but I am no lawyer. You must have had it long enough to tell how it works with you—whether its prohibitions prohibit or not? The proof of the pudding is in the eating. Does it so far work well? Does it protect the people? You and I would prefer a more educational preventive course—but alas! alas! this is "a free country!" Evil free; good enslaved. * * * Hope you will give full reports of its working as far as tested in this winter meeting."

Chas. Gibb writes under date of January 3d: "I have read in your Minnesota State Horticultural Society Report your recent law regarding tree peddlers. The law is a hard one, but I must say I like it, though you may find it well to amend it in some way. In former years our trouble was the sales of the cull trees at Rochester, N. Y., which were bought by agents and sold in the remote parts of the Province. They were often labeled according to orders, and gave people the impression that they could not grow apple trees. As a protection against this, we, together with those of Ontario, asked the government to put on more duty. The duty adopted was apple trees, 29; pear and cherry, 49; and plum 54 each. You ask if your new law is likely to work any injury to the provinces. If Ohio, New York and Michigan trees are doing harm, surely Ontario trees are also likely to do so. You must look to the interests of your State, and you have given us some ideas which it might be well for us to consider and act upon. I am glad the Dakota Horticultural Society had a good meeting. Sorry I cannot be with you on the seventeenth."

The Provinces have no grounds for complaint. While the duty on trees, as shown by Mr. Gibb, amounts to almost a total prohibition on their part, we allow them to ship us plants, trees, shrubs, and vines of all kinds, except medicinal seeds not especially enumerated or provided in the act last passed. Roots, seed cane and seeds imported by the Department of Agriculture or the U. S. Botanical Garden, fruit

plants, tropical and semi-tropical, for the purpose of propagation or cultivation. Fruits, green, ripe, or dried, all duty free with us.

The Province of Ontario extends down between lakes Huron, Ontario and Erie to about latitude 42, which gives them a most genial climate from which to furnish Minnesota with all the Russian apricot trees she may need at the low figure of 75 cents each—low considering their great bearing qualities in this climate—as we have it from a reliable Tree Dealer that some one produced 300 bushels of them from a small orchard last year at Brainerd, Minn. There they can furnish us with all the following popular plants in our State, viz: Paw paw, egg plums, peach, pear, nectarine, Baldwin, Mann apple, strawberry tree, blue rose, and blue blazes! all free of duty! Who says it is not our duty to avail ourselves of the rare privilege to stock up on Ironclads at low figures. Go in grangers, farmers' alliances, and monopolists!

We happened to have a friend at the nurserymen's convention in Chicago last June, through which we glean the following items:

Nurserymen here from all parts of the country, and nearly all disgusted with the Minnesota tree law. Some twenty or more of them have pledged themselves in the sum of \$75 each (which amounts to \$1,500 or more) to test the constitutionality of this law, and to secure to all the right of equal business privileges. Now, Mr. President, I am no lawyer, neither do I wish to assume the place of both judge and jury in regard to this law. I am well aware that all you expected of me was to open up the subject for discussion. This I have done as fairly as possible, showing the dissatisfaction on the one side and merely touching the gross frauds on the other. That we have a legal right to assist the tree planter to defend himself against foreign tree impositions no sensible person for a moment doubts. On the other hand, if this law allows and encourages every farmer in leaving his regular business and becoming a Tree Dealer because they can club together and send out of the State for what they want without giving bonds, while the nurseryman near by has been waiting upon them, and experimenting for their good and profit, till he is so poor that no one will sign his bonds, "must take a back seat."

Gentlemen, I am inclined to think with Mr. Chas. Gibb, that you may find it well to amend it in some way. It does look the least bit oppressive to say to a nurseryman that is too poor—as Prest. De Bell says "because honest"—to procure the bonds, in case, for instance the poor man thought he must have a dozen Jessie strawberry plants from Wisconsin—to put him under \$2,000 bonds "to keep the

peace," for this small offense does seem rather hard. In conclusion (as last years' wheat crop was a light one) I will suggest to the farmers who have been so grossly defrauded by Tree Dealers (mind you I do not say Tree Peddlers, as they are a far more respectable class) to come out as did the patriot of old and say: "Let the wheat lay and rot on the field where it grows, and the reaping of wheat for the reaping of foes."

DISCUSSION.

Mr. Pearce moved that the paper be filed for publication, which motion was carried.

Mr. Gould. Mr. President, I am one of the number that opposed the enactment of a bill of this character a year ago, and I have not changed my mind in that respect as yet; and with all due respect for all that was said upon this subject at that time, I must say in all candor and sincerity that the whole thing in my opinion is a mistake. Without passing any reflections upon the integrity and good intentions of those who took action in the matter, I would say now, after having had some experience in the nursery and tree business—I am out of that business at present—that I think there ought to be an amendment to that bill. Every tree peddler, every man who offers a fruit tree for sale, in connection with the offer should say to the person to whom he offers the tree that he don't have any faith in it that it will ever bear fruit, as for thirty years the effort to grow fruit has proved a failure. I think that is a fact; the trees that survive are very few. Of course we don't expect to raise cherries and peaches, nothing of that kind; but apples—I am speaking of the hardiest kind of fruit trees—apple trees. And I believe that after this winter of 1887-8, the trees that will be alive that bear apples will be very few and far between.

Mr. Pearce. They will be good ones, though. Mr. President, when this proposed enactment of a law in regard to the sale of nursery stock was under consideration, as you remember, I was opposed to it all the way through. It is well known that I don't believe in peddling fruit trees of any description in Minnesota. I think that after the millions of dollars of money that have been wasted in Minnesota, it is almost equal to robbery for a man to go out and sell fruit trees in the way that they are generally sold, as has been the custom here for at least thirty years, to my own personal knowledge. I am perfectly willing that everybody who desires should set out fruit trees; that they should be grown everywhere in the State; and if anybody wants

to set out fruit trees, let him go to the nurseries and get the trees at a reasonable price; that is where I stand. I am opposed to the tree peddlers in any shape or form in Minnesota. When it comes to plants, it is a different thing. If fruit trees are going to be sold by agents, I am in favor of asking the legislature to repeal that law.

Mr. Harris. Mr. President, I did not oppose the enactment of that law, and I do not oppose it now. Mr. Pearce has not made his point, or I have not understood him. The law does not prohibit the selling of trees. To compel us to send to the nurseries and get them would be pretty rough. In regard to this law, we did not expect a perfect law. We knew it was very imperfect, but we had to take what we could get. I think there can and should be some amendments made to it. I think the legitimate nurserymen, who have a few acres planted to a nursery, who are doing an honest business in the State, ought to have the right, if they want to obtain a dozen grape vines outside the State, to do so.

Mr. Pearce. In that respect it does not affect the nurserymen in this State.

Mr. Gould. That is the trouble, it does. I claim an honest man can't do business in Minnesota and sell nursery stock, if I understand the bill.

Mr. Harris. I think after the law has been in operation a short time we can see where it comes short, and can have it amended. The law has worked well in our part of the State. In one instance a party took a few orders on Saturday. On Sunday a member of this Society happened to be near there, and on Monday morning he went with the man who had given the order to see the agent and called for his papers, wanted him to show that he had given the bonds up here at the capitol. He was selling stock for a firm in St. Paul that don't own any nursery. He could not produce the necessary papers, and they gave him just so long a time to get out of town, and he got. There was another similar instance in another portion of the county. The party was operating who could not show any authority to sell, and he was informed that if he took an order in the place he would be prosecuted, and he left. So there has been very little of that kind of work done in that part of the State.

I think we should keep the law we have until we have tried it a little more thoroughly. It doesn't prohibit any man sending where he wants to for stock. I think anybody can order stock. The legislature has a constitutional right to levy a tax upon every citizen of the State to help support the government. It seems to me that it is con-

stitutional to put some check upon these scamps who are traveling through the country selling worthless nursery stock, for they are nothing more nor less than that. They should be made to take out a license. Pack peddlers are required to pay a license, and why should not the tree peddler?

Mr. Dartt. I don't see as it can make any material difference just now whether we are in favor of this law, or opposed to it; it cannot be changed before another winter, and I don't know as there is any use of our taking action in regard to it. We will have plenty of time another winter, if we want it changed, to make an effort to get the change made. I don't think I opposed the passage of the resolution very much, or said very much in favor of it; but I think I did warn our friends to be cautious, and not ask the legislature to pass a law they did not want. First, to be sure that they wanted it before they asked the legislature to pass it. I did so on the ground that this Society ought to know better what the interests of the State required in this regard than the legislature. I still think so, but it seems to me as good a thing as we can do now is to lay the matter on the table.

Mr. Thompson. I met one of these tree peddlers in Fayette county, Iowa, yesterday, on the train. He had one of your Minnesota licenses in Iowa, in our prohibition state. [Laughter.] I thought it was queer. He directed me to call on L. L. May when I came to St. Paul. I informed him that we Grundy county farmers were acquainted with that name, but I did not know whether his license was good or not; we had a "prohibition law" in force, and I thought he would have a fine time selling his trees. By the way, this same firm was operating in our part of the country quite extensively a year ago last spring, and if there was ever a set of farmers defrauded and robbed, it was our Grundy county farmers. A year ago this fall there was one set of agents of L. L. May, and another set of commission men that represented the Chase Nursery, of Rochester, N. Y., that were operating there to some extent. They bought their trees of Mr. Speer, of Cedar Falls. They got two loads of trees that had been condemned by him, and brought them to Grundy county. Some of the trees still had tags on them. On inquiring of the man who drew them down, he said he got them where Mr. Speer had piled them up intending to burn them, and that they gave him \$5 to draw the load of trees to Grundy Center, which he did, thinking there was no harm in it; but when he returned Mr. Speer discharged him. They had all manner of names for the trees which they peddled out to our Grundy county men, but as good luck would have it, not more than one in a hundred lived, so they

simply lost their time and the money advanced. These are what we call "pocketbook emptiers" and "scalpers" in our part of the country, instead of honest nurserymen. We want no tree that has been grown east of the Mississippi river, for Iowa planting. When farmers will quit patronizing these traveling agents, take only home-grown stock, receive it when it is alive, and take judicious care of it, then there will be less complaint than there is now-a-days from worthless trees.

I had a little bit of experience this summer. One of your residents of this State came down our way, and he was introduced to some of my friends. He was no more fit to handle an apple tree than a boy to handle a steamboat. Some of our men in our county bought trees of him at big prices; they threw them into the cellar, never covered them up, never went to the railroad depot to get them until fifteen days after they were brought there. Of course the trees did not start the next season. One neighbor who set out the trees used his lot for a hog pasture, and because the trees would not stand against the hogs and the dry weather, he complained that the trees "went dead," and turned around to the agent and wanted to know if he would refill the order. The agent told him he would, and asked him what he wanted; opening his canvass he asked him to take his choice; he replaced them with Hyslop crabs. Whether he will be able to make a good stock-yard with those or not I don't know, but he is going to try the experiment. When we have such men as those to handle fruit trees it is no wonder we have failures. Until I saw these methods pursued I was a little down on the scalpers.

Mr. Pearce. I would like the Society to take some action, and place us before the State in a proper light. This whole thing is a slander on this Society. I took advice upon that law from a good lawyer, and paid him for it. He told me the law wasn't worth as much as the paper it was written on. It is a mere scarecrow, and I would like to have an expression from this Society in regard to its amendment or repeal.

Mr. Gould. Mr. President, I supposed this paper was read with the intention of having a general discussion of the subject here. I have not pointed out my objections, and will not do so if there is no opportunity given for discussion.

Mr. Underwood. I was about to ask, what are the objections to the law? I have failed so far to catch any particular point, or objection. I never took any part in framing, or assisting to enact the law; I don't quite see the necessity of it, because I have always been considerable of a "free trader," although I have always trained

in the Republican ranks. I don't know that I heard what the objections were. Of course, if it is not really lawful, or is unconstitutional, why that is a matter which would bear investigating, and it ought to be, perhaps, if it is so considered by those who have given it attention; because we do not want, as a Society, to be placed on record as assisting to enact a law, or being responsible for a law, that really don't amount to anything. We want to be dignified, and to be careful of what we do; but I am perfectly in sympathy with the idea that we only want to do what is endorsed by the State Horticultural Society. Having asked the legislature to pass such a law, I don't see how anyone is to know whether it is of any account or not without making some inquiry; and if there are any of the gentlemen present who have been taking notes of the operation of the law, I should think for the matter of discussion, inasmuch as that is what we are here for, now that the paper has been read, that we ought to know what the objections are, so I shall be able to vote and act understandingly in the matter.

Mr. Dartt. Mr. President, I feel opposed to taking any action on this at the present time for the reason that the action will do no good; we cannot annul that law; it will stand whatever action we may take, and inasmuch as we cannot change it I think it is better for us to say nothing about it at present. One gentleman says we want to maintain the dignity of the Society. The question is whether we want to maintain its dignity as much by keeping still as we will by showing that we have changed our opinion since last winter, unless we have changed it for some good reason. If there is any benefit in it as a scarecrow let us have the benefit. But if there is not any benefit in it and those who oppose it want to contest it, why they can do so just as well as if we passed resolutions in regard to it; our action won't make any difference. Let us leave the subject without any expression on our part, merely on the ground that the time has not arrived for us to give such expression of our views. If we take an expression against the law, and say it isn't good for anything and we don't want it, why then we would want to use all the moral power we have against it; but I doubt whether that would not be like boys' play. Now, I think the law has done some good probably, and that it has proved not to be a serious hardship to the nurserymen of the State. Of course they can't buy stock to sell again out of the State. So far as these apple trees are concerned that my friend wants prohibited entirely, I don't believe we want any law for that; I believe that the people have made up their minds that there is not much use to

plant apple trees. I don't believe a canvasser could go through the country and sell a very great many apple trees at best. I hope there won't be any action taken on this matter only to lay it on the table.

Mr. Gould. Mr. President, and gentlemen of the Horticultural Society: There are two objections, to my mind, that are serious ones, that are worth considering at any rate; and the very thing that my friend Mr. Dartt referred to last was of the number I had in mind. It is not supposed that a dealer in this State raises everything he sells; as a general thing that is an impossibility. The truth is it is better for the nurseryman to buy some of his stock; he knows where to buy it and have it pure and sufficient in every respect for his customer. I have been in that position fifteen years or more and have always bought more or less stock outside of the State. While I have made some mistakes and delivered some things that were not true to name, and perhaps things that people had better not bought, still I think I have done about as well as most men engaged in the business in Minnesota. I know it has been very convenient for me to have an opportunity to buy outside, and it is the same with others. It is just as well for the customer also. The most serious objection, perhaps, is that if this thing was carried out fully it would make a monopoly of the business; the customer and the farmer would suffer, because there would be no competition in the field worthy of the name. Of course I care nothing about that personally as I am not now interested in the business; but these are points I wish to make as I see the matter in that light. These facts will be conceded by my friend Dartt that we can get good stock in Wisconsin, Illinois, and even Ohio and New York. I would just as soon have a grape vine grown in Texas as in Minnesota, and it will ripen just as early. I think the same would hold good with raspberries and strawberries. I believe this law is unconstitutional. I think there was a decision in Texas, on a similar law, within a few months past, but this has nothing to do with that. We are not supposed as a society to pronounce upon the legality of the act, but I would like to see an expression taken upon it. We ought not to be so modest that we cannot acknowledge a mistake we have made. I don't hold myself responsible one way or the other for its passage, and I would like to see some action taken upon it.

Mr. Sias. This is what some claim to be class legislation. It seems that there should be some way to protect ourselves against these gross frauds without casting odium or contempt upon other honest nurserymen here in the Northwest. It seems as if this thing was gotten up entirely to protect such men as these consummate fools that don't

know any better (up here along the line of the Northern Pacific road) than to buy apricots, which Prof. Budd says may do well south of parallel 41, and in tropical latitudes. Now, in order to protect such men, we put every nurseryman in the Northwest under two thousand dollars bonds to keep the "peace," as someone has it. It seems to me we ought to have some way to protect ourselves from these frauds, but most of the nurserymen seem to think we have not hit the right thing; they do not doubt the honesty and good intentions of the parties who got up this thing. I haven't a particle of feeling against them; I believe they did it for the best. They supposed they were working for the good of the greatest number. But I think with Mr. Gibb, of Canada, that the law needs to be amended.

President Elliot. I have listened with a good deal of interest to what has been said. I suppose if there is any one man in this organization that is responsible for the passage of this law, that I have done my share. I know I put in considerable work to secure its passage, and I know how it was fought in the legislature by the tree men. I know from the time we started with it until its final passage, it met with determined opposition. The law has some features we did not attempt to put in it, and they were perhaps put there by the tree men themselves.

Mr. Dartt. To make it odious?

President Elliot. To make it odious. We were obliged to take such a law as we could get. We wanted some barrier put up against these wholesale frauds. When a man comes into our country and attempts to peddle stock grown in the South and East, and says it is just as good as Minnesota-grown stock, he is stating that which he knows to be untrue. Experience here has taught us all that we have got to come down to our own home-grown stock if we ever expect to raise any fruit. Now, we may have put our foot into it in passing a law of this kind, but where there is so much squirming among these Eastern nurserymen and tree dealers, it shows that it must have hit somewhere; it hit a tender spot.

President Colman, in his address before the Nurseryman's Association, in 1886, called the attention of nurserymen to the methods practiced for the distribution and sale of nursery stock, as not being what it ought to be, when the business is conducted upon right and business principles. And every time a man that is not interested in some way, either in the sale of stock, or a member of a nurserymen's association, or something of that kind, if honest to himself and he tells his honest convictions, he will tell you that it was for the public

good that we had this bill passed. It isn't to protect the nurserymen, or the tree dealer, but to protect the people, who are being swindled.

Now, if there is any possible way to protect the innocent, we ought to do it. I have looked upon the methods practiced by some of these tree agents with a good deal of disgust. I started in the nursery business at one time, feeling that I could carry on the business honestly and in a legitimate way, and feel that between my own conscience and my customers that I was doing an honest, upright business. But I soon found that if I put an agent in the field I had to throw principle away. There is no man that sends out a tree agent that can govern his agents, as a general thing. Where he is selling on commission he will sell that which he can sell to the best advantage, it makes no difference whether it is a crab apple or a Rhododendron.

It seems to me it is all boys' play for us to pass any resolution saying that we will take back all that has been done in regard to this tree bill. As Bro. Dartt says, it will amount to nothing to take any action at present.

Secretary of State Mattson is probably as well posted as any one as to the working of the law. He has had considerable correspondence with parties in regard to it, and it has added to his official duties in having the oversight of this law. He says the workings of it are all right.

So far as the objection as to its constitutionality is concerned, we had that passed upon by the attorney general, who gave us his opinion that it was all right—that it was constitutional. What the judges may decide when they get it into the courts is another question. But until it is carried there I shall consider that it is just as constitutional as any law we have. Furthermore, if we have no right to prevent these men from coming in here to defraud and cheat and lie to us innocent grangers, why is it we had an insurance law passed? Outside companies sent their agents here to do a dishonest business. Our insurance law has been upheld by the courts, I believe, and these foreign agents have been withdrawn from the State, and now insurance men are doing a legitimate business. An insurance commissioner is appointed to look after all the insurance business. Why should there not be the same propriety in having a wholesome law to prevent nurserymen from defrauding the people? I think if we discuss the thing in all its bearing we will find that we want to protect the innocent, poor people, and that the men who are making their hundreds of thousands of dollars here, selling their nursery stock, are the ones we want to guard against. [Applause.]

Mr. Thompson. While listening to the remarks, it occurred to me that it would be a good way to test the law by each one seeing that it is rigidly enforced. You will soon find out whether it is constitutional or not. Our friend over here says one lawyer told him it wasn't. Lawyers sometimes tell the truth, but to my sad experience I know they won't all the time, so it won't always do to believe what they tell you.

Mr. Pearce. I suppose you consulted one, probably?

Mr. Thompson. Yes, and I paid him well for it.

Mr. Dartt. I call for the question and think we had better dispense with further discussion.

Mr. Underwood. I don't think we want to choke off discussion. That is what we are here for; it is one of the things that concerns us, and I say let the discussion go on. I have come here to learn something about this matter as well as the rest of you. I don't know whether the law has proven to be any damage or detriment to anyone or not. I have not thought much about that, as I have been steadily pegging away. Of course I wouldn't like to say that I would continue to support a law that ought to be amended; and when the proper time comes, to amend it would be all right. Now, we had our committee of this Society get up this law and frame the bill, and I have no doubt it was done under the best of counsel and advice; and we don't want to be like children about this thing. It is all right to discuss it and to be sure that we are right. I don't care anything about these eastern nurserymen if they do squeal about it in their conventions. They may think they have the right to come in here and repudiate it if they want to, as being unconstitutional; but they will never do any such thing, because they have plenty of men and can put their agents in the field, and will do so if they want to. Personally I don't think I would have had any such law—just personally—just consulting my own personal relations. I know this: that there is that cousin of mine who knows we are in the nursery business, and that all he has to do is to let us know what selection of stock is wanted, that when an agent comes along he will pay \$3 for a worthless plant that would never grow anyway if set out. But what is the use, you might legislate till doomsday and you never would break that cousin of mine; he would still continue to pay the \$3 for nothing. You must educate the people if you want to get them to avoid these frauds; but if you can protect them by law of course it is all right.

Mr. Dartt. If there are any real objections to the law it will be time enough to have them presented another winter, and then to have the law amended.

President Elliot. You are connected with the Lake City Nurseries, Mr. Underwood. In the working of the law has it been any detriment to your business?

Mr. Underwood. I can't say that it has. Of course I haven't so much charge of the sales department, I am interested in the production; but I have not heard that it caused any detriment at all. In fact I would not have known there was any law of the kind so far as it has affected our business; we can't see that it makes any difference. Those gentlemen that talk against the law must do the talking. Still they will abide by the law I think. I could not say it has been any detriment to us, no, sir.

President Elliot. In my relation to this Society, as president, I have heard of no complaints further than one or two inquiries in regard to certain concerns in this city, as to whether they were doing a legitimate business. I looked the matter up and decided that they were so reported; further than that I have heard no complaints at all. Last year there were many complaints. A notice was published in the *Farm, Stock and Home* last spring, requesting parties having complaints to make them known and they would be properly looked into; but we haven't heard of one complaint outside of those that come from nurserymen and agents outside, that wished to come in and dispose of their stock.

Mr. Underwood. Don't you understand that they can come if they want to?

Mr. Gould. Can't a nurseryman in this State send outside and get any Jessie strawberry plants and sell them here without laying himself liable to prosecution?

Mr. Dartt. He can if he will set them out and grow them an hour—he can take them up and sell them. [Laughter.]

Mr. Latham. Is that the way you do?

Mr. Gould. That is the difficulty. I am afraid it will make some of our people dishonest.

President Elliot. I pity the dishonesty with that class of people!

Mr. Latham. Mr. President, I understand the matter is still under discussion. There are a class of laws in force in Canada and Manitoba that are sometimes called paternal laws. It is taken for granted that the citizen is entitled to protection from the government. It is the same with the law we are talking about. There are quite a number of laws on our statute book of this nature, as for instance the law with regard to manufactured butter and the adulteration of milk, which are just getting into force, the insurance law, etc. The tend-

ency is to increase the number of these laws, and to throw protection around the general public. I think that is legislation in the right direction. I know many think that every individual ought to go it alone, but if our law could be amended somewhat it might be better; of course it is impossible to do that before next winter. It seems to me we cannot change the law now. We don't know now how it is going to work, and if all we want to do is to amend it to make it better, we had better take no action at this meeting.

Mr. Pearce. I think there are a good many improvements we can make. I didn't know but we might get ourselves into trouble. I went over to St. Paul. I have a brother there that has been in the law business for a good many years, and he looked this matter up carefully, and told me that any nurseryman could buy and sell and use, so far as the law was concerned; if anybody was a mind to contest it, which they would, it would be set aside. Now, on the strength of that, I bought rose bushes.

Mr. Latham. Let's send him up. [Laughter.]

President Elliot. This law was not intended to prevent a man from selling stock and conducting a legitimate and honest business. I know the law has met with opposition; it has, certainly. So it was in regard to our insurance commissioner. Men that were doing an honest business were protected as well after the passage of the law. It was only those that were committing fraud that needed to be suppressed. You will find by reading this law carefully that the object is simply to prevent fraud; it is right there in a nut shell.

Mr. Gould. It seems to me there is great danger of innocent dealers being prosecuted for damages; there certainly is.

President Elliot. Not if they are honest.

Mr. Gould. I claim to be just as honest as other persons, yet I had a claim brought against me of \$10,000, and if I had not defended myself I would have lost it, and I was not to blame at all; it was clear malice. Here is a case: Friend Pearce has admitted that he has transgressed this law. Suppose I get into a quarrel with him, and I take advantage of this. It seems to me there is a weak point in the bill. I wouldn't go into the nursery business with that law standing there, because I know I couldn't go into it and do a decent business and be restrained; and these gentlemen won't be.

Mr. Sias. I haven't a particle of doubt about the good intention of this law, and never had. But it reminds me of a certain party that I knew about in New England, a sort of bully, who lost some property; he traced the matter up and came to the conclusion that

the man who stole the property was one of seven men that he knew, and he said he was going to whip the seven men in order to be sure and find the right one. That is about the way with this law; they calculate to whip every man in the Northwest for the sake of whipping the right man. It seems to me there ought to be some other way to get at it. I am just as much in favor of punishing these fellows as any of the rest of you.

Mr. Dartt. Mr. President, there seems to be no doubt as to the intention of the law. It was intended for the punishment of criminals. The question comes up, what does it do? It is not what is the intention of the law, but what it does itself. I have read it carefully, and I claim that any man that ships in any article of nursery stock and sells it without first growing it himself, or giving his bonds, is liable to pay a fine. That is the straight reading of the law. If this was not so we could bring in foreign stock and sell it, as May & Co. did; but it was to hit just such cases exactly. You may say that if Bro. Pearce wants to import a few plants he can do it. But if he can, why cannot Mr. May? Laws are made that way. I claim the law as it stands hits those it was not intended to, but I don't believe our discussing it to-night will be productive of any good; we might better leave it just as it is.

Secretary Hillman. At the annual meeting of the Society one year ago, the committee of five, which had this matter under consideration, reported recommending unanimously in favor of the enactment of a law to prevent frauds in the sale of nursery stock. The legislative committee was expected to prepare a bill and to obtain its passage in the legislature. The one prepared was introduced in the Senate, and was afterwards very carefully considered by the judiciary committees of both houses, and approved so far as its constitutionality was concerned. The object of the law was simply to prevent the practice of fraud, and in procuring its passage the committee simply followed the instructions of the Society.

President Elliot. I would like some expression as to whether there is any need of the law."

Mr. Latham. I move as the sense of this Society, that some law is needed for the protection of the poor from fraud and misrepresentation in the sale of nursery stock.

Mr. Underwood. I think that hardly covers the ground. We have got the law, and why should we pass such a resolution when we already have it? As long as we have it, I think we want to pass a resolution endorsing the action of the legislative committee in securing the law that we already have.

Mr. Harris. I would like to see that motion of Mr. Underwood's carried. This law was passed in the interest of the agricultural portion of this State, and if we simply turn around and ask to have it repealed without giving it a fair test, it seems to me they will have no further confidence in us.

Mr. Underwood. I make that motion. If we see after studying the workings of the law that it is not what is desired, why then we can recommend that it be amended so and so. But for us to take any other action than that, it seems to me would be out of place, really. And I would like to say, now that we have had a legislative committee appointed, in whom I have confidence to believe that they did the best they could. The judiciary committees in the legislature considered the matter, and a prominent lawyer of St. Paul appeared before one of the committees in opposition to the bill; and since both bodies of the legislature have passed upon it, and it has been only about a year since the measure was passed, I say—while I don't see any need of the law, believing that every tub ought to stand on its own bottom, and that people ought to be intelligent enough when they buy anything to know what they are buying; still I am in favor now of endorsing the action of that committee, and thus showing our confidence in them in what has been done. If it ought to be amended, it should not prevent endorsing the action of the committee.

Mr. Nobles. I second the motion, but I object to the amendment.

President Elliot. I understand the amendment goes further than the motion of Mr. Latham, and endorses the law.

Mr. Gould. I want to offer an amendment to the amendment, in order to protect my friend Pearce and others. I am candid in thinking the nurserymen of the State should be protected; outside of the State I don't see anything wrong.

President Elliot. They are protected in this way, that if they go and file their bond they have a right to buy and ship as much as they have a mind to.

Mr. Harris. I suppose the filing of one bond is all that is necessary in order to conduct the business according to the requirements of the law.

Mr. Underwood. I hope we shall have confidence enough in our committee to endorse their action. Because a few nurserymen down east have made a howl that should make no difference. And because some of our small fruit growers object to it is no good reason for refusal to do this; the simple matter of paying a couple of dollars for filing the bonds required, is a small matter, and it would have fixed

the matter all up and given them the right to ship in all the peach trees and high priced strawberry plants desired, and in the first sale they would have got it all back. It reminds me of the druggist telling what the profits of the drug business are. He said a boy came in and ordered a small prescription and he told him it would be fifteen cents. The boy handed him five cents. Supposing he misunderstood him as he did up the package he said "fifteen cents." "Yes," said the boy, and took the bundle and started off—it was all the boy had. As he closed the door said the drug man "Well, go to thunder, I made three cents off him anyway." [Laughter.] So you see you can get your money back; just file your bond and the first bill of Jessie strawberries you sell you get the money back! The question now is whether we shall endorse the action of this committee. Another year if you wish to get up some amendment to the law it will be all right.

Mr. Pearce. I think friend Underwood is all wrong. That bill was not passed upon by the Society. It was fixed up by the legislature.

President Elliot. The Society took action on the matter and instructed the committee to get such legislation as they thought the Society wanted; they did the best they could.

Mr. Pearce. We admit you did nobly; we didn't have any idea you would get anything at all.

Mr. Latham. But you see they did.

President Elliot. You should not have appointed the committee and given them instructions what to do, if you did not wish any action taken.

Mr. Pearce. The bill that was wanted was not the kind of one that was passed by the legislature.

Mr. Dartt. Mr. President, I have been opposed to any kind of action. Now this resolution contemplates action, and means that we endorse the law. If we are committing ourselves for or against the law, I want to go against any action. I don't think we need to take any action until next year, and then we will decide. If we don't want to approve of it, it seems to me we want to vote in opposition to this resolution.

Mr. Pearce moved to lay the motion on the table. Lost, by a vote of eight to seven, several members not voting. The motion of Mr. Underwood was then carried.

On motion of Mr. Harris, the meeting adjourned till Wednesday morning.

MORNING SESSION.

SECOND DAY, WEDNESDAY, JAN. 18, 1888.

The meeting was called to order at 9 o'clock, by President Elliot.

The first thing on the program was the report of the seedling commission.

REPORT ON SEEDLING FRUITS.

By J. S. Harris, La Crescent.

Mr. President and Members of the Minnesota State Horticultural Society:

I fully realize the importance of the work of the seedling committee, and only regret that I am not able to make it more effective.

The season was most unfavorable for the prosecution of our work, owing to the shortness of the fruit crop, which was probably caused by the severity of two or three previous winters, unfavorable conditions of the weather in the season of blossoming, and the severity of the drouth that prevailed during much of the summer.

With the exception of one single locality, I found that even the Siberian and Duchess were not carrying the usual quantity of fruit, and numbers of trees that bore well in 1886 had scarcely a specimen in 1887.

IN WISCONSIN.

On the twentieth and twenty-first of July I visited the Russian orchards of A. J. Tuttle, and others, at Baraboo, Wis. There I found the Duchess, Tetofsky, and about twenty of the newer varieties of Russians, fruiting quite liberally. Mr. Tuttle's orchard of new Russians contains over sixty varieties, and about half of them appear to be as hardy as the Duchess, about the same proportion of them are strong, thrifty growers, and comparatively free from blight. Blight was prevailing to an unusual extent in that vicinity, and the Duchess and Tetofsky were suffering about as badly as I had ever seen the Siberians, and Mr. Tuttle's old orchard of the hardiest American variety was about ruined by it. There was, however, but very little

of it in the orchard set exclusively to the new Russians, and that was confined chiefly to varieties of the Alexander type. The following varieties were well loaded with fruit, and impressed me as being the most valuable: Hibernial, Glass Green, Juicy White, Red Wine, Garden Apple, Blue and Yellow Anis, Charlenthaler, Early Champagne, Yellow Transparent, Trees of Lord's Apple, and Repka, Beautiful Arcad, Raspberry, Summer Lowland, and some others, were fine trees, but were bearing poorly.

The Hibernial is perhaps the best tree of all, a free and regular bearer of large, fair fruit. The season is late autumn and early winter use, cooking, and for that purpose it is excellent. The Red Wine is a splendid tree, fruit medium, very beautiful, but quite acid; season rather earlier than Duchess. Glass Green resemble the Duchess in tree, and fruit not quite as acid. The Garden Apple is sweet, or nearly so, and apparently a very hardy tree; season early autumn. The trees of Early Champagne were bearing to their fullest capacity. Mr. Tuttle informs me they are annual bearers. The trees appear hardy on his grounds. If it should prove adapted to Minnesota it will become our most popular summer fruit. In size it is below medium, quality very fair, is as productive as any of the crabs, and it ripens up gradually, so that it is in season from July to September.

In an orchard near by we saw trees of the Antonovka in full bearing, and apparently sound. These trees are among the best growers of the Russians. The fruit was larger than we expected to see it at this season of the year. Prof. Budd speaks of it as the king apple of Central Russia, and a good keeper. We trust that it will be widely tested in this State. The varieties of the Anis family are doubtless hardy, and the fruit of the Yellow Anis, the only variety we have sampled (and which, by the way, was not a yellow apple), is of prime quality. Season same as the Wealthy.

We here saw the Lucretia dewberry in bearing, and we were much pleased with it.

IN NOBLES COUNTY.

On the 27th and 28th of July A. W. Sias and myself made a visit to the orchard and gardens of H. J. Ludlow, at Worthington, and we were agreeably surprised to find there the most fruitful orchard we had seen in the State this season.

We found this thrifty young orchard looking fully as well as when we visited it last year, and fruiting to its fullest capacity, and never in any locality have we seen the Tetofsky doing so well. The bear-

ing varieties are chiefly Duchess, Tetofsky, Wealthy, and some seedling varieties and Siberians and their hybrids. We estimated the crop at two hundred and fifty bushels of the larger apples, and nearly as many Siberians. The orchard is situated about thirty rods south of Lake Okabena, and is protected on the west by a willow windbreak, about two hundred feet distant. A windbreak nearer than that to an orchard would prove disastrous, owing to the tendency of the snows to lodge inside of it in huge drifts.

Our objective point was the Okabena seedling tree, upon which we reported at the last winter's meeting. The tree passed through last winter without any perceptible injury, and was now carrying a fair crop of most beautiful fruit. It has not been tested elsewhere, but if it proves as hardy in other localities as here, and has the constitution to resist blight, it will prove of immense value to the Northwest.

We discovered another seedling in this orchard having the same origin, which seems to be equally as hardy as the Okabena, and is believed to be a longer keeper. The fruit is just the right size for desert and retailing, beautiful as a coy maiden, and of excellent quality, an agreeable sub-acid. These trees are true Minnesota seedlings, and probably seedlings of the Duchess and Wealthy, more beautiful in appearance and better in quality than either; are they not a "rainbow of promise" for the future of apple culture in this State? Will they not encourage us to save the seeds of the hardiest and best fruit raised in our own State, plant and raise trees, saving only the best, continuing to do so until we have reached the climax of our proudest hopes?

These fruits were afterward shown at the Southern Minnesota and State Fairs, and greatly admired by all who saw them; and the latter were awarded the first prize over the Wealthy as being the best seedling apple grown in the State, and very appropriately named "Daisy."

IN COTTONWOOD COUNTY.

We made our next stop at Mountain Lake. The people here are largely Russian Mennonites, and there is an air of neatness and thrift about their homes that we seldom see in a newly settled country. Thrifty groves and rows of forest trees surround their dwellings, and they are given thorough cultivation and kept as neatly as the best public gardens. These people are great lovers of fruit, and several of them brought with them from their native country seeds and trees, of apple, pear, plum and cherry. Thus far they have

not met with much success, and it is not to be wondered at, as many of them came from a portion of Russia where the climate is similar to Southern Iowa and Nebraska.

The cherry trees have fruited, and are said to be hardy and fine; some of the seedling pears and plums look promising. The deep snow of last winter was very disastrous for them. Snow drifts formed inside the shelter belts to a depth of ten to fifteen feet, and as it settled away in the spring crushed the trees to the ground or denuded them of their branches. Otherwise, I think we should have been rewarded with the sight of some fruit.

Important lessons can be learned here in regard to windbreaks and shelter belts. Evidently the outer rows should be placed two hundred feet or more from the orchard, and if more shelter is needed a low belt of mulberry, or some other shrub, might be set say sixty feet outside the fruit trees.

Some attention is being given to the cultivation of grapes, and two hundred bearing vines seen on the place of Peter Goertz convince us that they may be successfully grown here when properly managed.

Our next stop was at the place of Dewain Cook, about fourteen miles northwest of Windom, the object being to examine his hardy dewberry. It is evidently a variety of *Rubus Canadensis*, and appears to be more shrubby and less trailing than the varieties found native in the eastern part of the State, or the Lucretia or the Bartlett. It may be identical with a variety that in former years was found growing at St. Anthony.

With Mr. Cook this plant is enormously productive, and a large portion of the berries are perfectly filled, which would indicate that it is a strong staminate; it may prove valuable for fertilizing the Bartlett and other shy fruited. We found the fruit about the size of Stone's hardy blackberry, but Mr. Cook is growing them without any thinning or pruning, and the fruit would probably be much larger if greater pains were taken with the pruning and cultivation. The quality of the fruit is very good. They are growing upon a deep, rich, prairie soil, and if they succeed as well in other localities and soils will prove a most valuable addition to our list of small fruits for farmers. We have taken steps to have them tested in other localities, and expect that another season we shall know more about them.

Mr. Cook has a great variety of trees and plants on trial, and we shall watch the result of his experiments with great interest. With a few such men in every county in the State our perplexing fruit question would soon be settled.

On returning to Windom we stopped for an hour at the place of Joe Wood, distant about four or five miles from the above named place. He is quite enthusiastic on the fruit question, and showed us some promising seedling varieties of raspberries, gooseberries and grapes of his own raising; also a tree of the Russian mulberry bearing fruit as large as the Ancient Briton blackberry.

We noticed that forestry plantations and windbreaks are receiving considerable attention among the Mennonites in this county, as well as other parties who design to make this their permanent home, that they are doing fairly well, making a good season's growth, except in some instances where they have received serious damage from insects.

The willow worm and cottonwood tree beetle are increasing at an alarming extent, and it does seem that if our legislature felt any interest in the future welfare of the people of this State they would take some steps towards making investigations in this matter. Your committee suggest that our Society petition the Department of Agriculture at Washington to give this matter their early attention.

IN RICE COUNTY.

On the fourteenth of October Mr. Sias and myself paid a visit to the Peerless apple tree, standing on the farm of J. G. Miller, of Rice county, about eleven miles southeast of Faribault. We learn that the tree is seventeen years old, and was raised from seed of the Duchess of Oldenburgh, saved from fruit raised upon a farm about one mile west of where the tree now stands. In the orchard from which the seed was taken there was growing in proximity to the Duchess, bearing trees of the Golden Russet and Talman Sweet. The Peerless proved to be the hardiest and best of a batch of seedlings raised by Mr. Miller, eight of which fruited and specimens of the fruit were exhibited at the State Fair about ten years since. I remember at that time I was favorably impressed with the appearance of these seedlings, and pronounced most of them of a quality superior to the Duchess, and thought some of them would prove better keepers. There are now but three of these seedling trees left. Two of them do not appear to be as hardy as the Peerless, and are but little if any better in quality, or later in season, than the Duchess.

The Peerless has successfully endured three of the most trying winters known in Minnesota, and is still in very good condition, but perhaps not quite up to the Duchess of the same age, although it is a larger tree. It has lived to see two generations of what are termed "Iron Clads," including the Wealthy, totally annihilated, and Mr.

Fuller says has been the most profitable tree in his orchard. It is a vigorous, medium, upright grower; the trunk is about ten inches in diameter; it is about four feet from the ground to the first branches. It is growing upon the north side of a belt of willows, but much too close to them for the best results.

Mr. Fuller has had about one hundred and fifty trees of different varieties in his orchard, all of which have killed out except the Duchess, a few varieties of Siberians and these seedlings. This tree was not fruiting this year. In size it is about like the Duchess, and the season is said to be from December to March. He has quite a number of young trees raised from seed of the Peerless, several of which look very promising. He also has several trees from seed of Transcendent Crab that are free from blight, and one of them is the most beautiful and hardy looking tree we ever saw. The fruit is larger than the Transcendent, keeps a month later, and is said to be of better quality.

We left his place chanting to ourselves the old song so often sung by the late and venerable Marshall P. Wilder—

“ Plant the best seeds of all your best fruit,
Good fruits to raise that some lands may suit ;
Fruits which shall live, their blessings to shed
On millions of souls when you are dead.
Plant, plant your best seeds, no longer doubt
The beautiful fruits you may create ;
Fruit which, perhaps, your name may enshrine
In emblems of beauty and life to shine.”

We have learned of some other seedlings of promise, but the information came too late to pay them a visit. One is at or near Kasson, Dodge county. It is reported to be a seedling from the Duchess, from twelve to fifteen years old, having thus far withstood the winters better than the Duchess. The fruit is about the size of an orange, of good color and flavor; season about January. We understand it was on exhibition at the Southern Minnesota Fair, and trust that Mr. Sias will give us a further report on its merits.

The seedling of Jacob Kline, of Houston county, is reported as still healthy, and having produced a liberal crop of fruit during the past season.

It is reported that R. D. Frost, of Madison, Wis., has a seedling tree that bore twenty-five bushels of apples in 1886, and that scions could be procured of him for testing at our experimental stations.

The Cheney plum, a native variety found in Vernon county, Wis.,

is gaining in favor. It is early, productive, and larger than the De Soto. I have the promise of scions for the use of our experimental stations.

So far as the behavior of the newer Russians is concerned in this State, we have been able to add but little to our previous knowledge.

We had hoped to get some valuable points from the Russian trees in the orchard and nursery upon the State Experimental Farm. We did go there to see them dug, and to give each number a careful and thorough examination, and to take copious notes of their behavior as nursery trees, the character of the foliage, etc., but were unfortunate in finding Prof. Porter absent from home. All of which is respectfully submitted.

REPORT ON SEEDLING FRUITS.

By A. W. Sias, Rochester.

Your committee are not content, in the second year of their service, to add nothing interesting or valuable to their report. Our first year was of necessity spent in reconnoitering the extensive field before us, and all that we had time and means to do was to report on a few what we considered to be the most worthy trees and fruits. That we have failed to find all the best varieties in the great field before us, is more than likely. We advertised through the press for all those having choice new fruits to inform us that we might examine and report upon them. But very little attention has been given to this call, and that accounts in a measure for the brevity and lack of information of the present report.

The first thing, perhaps, worthy of note for our report was during the summer meeting of the Olmsted County Horticultural Society; held June 11th, where the first exhibit of the famous Jessie strawberry was made to a Minnesota audience. These berries were so large that they were eaten as you eat large apples, by biting off the sides first. Some of the far-seeing ones present said they would take some home and plant the seeds from them. Your committee saw at a glance that that was the most sensible speech made during the session. And after they had all finished their bountiful feast and taken what they pleased to plant, your reporter carefully gathered up the fragments, and the result was in the fall he was able to show, and did exhibit to T. T. Lyon, of Michigan, and other noted horticulturists, some five hundred plants of little baby Jessies as fine as F.W. Loudon

or any other expert would care to look upon. We mention this not in a braggadocio spirit, but rather as an example of what others should do for the improvement of our best fruits. I say best because Mr. Loudon has fairly demonstrated the truth of what A. J. Downing uttered over forty years ago, viz: "Once in the possession of a variety which has moved out of the natural into a more domesticated form, we have in our hands the best material for the improving process, The fixed original habit of the species is broken in upon, and this variety which we have created, has always afterward some tendencies to make further departure from the original form."

Mr. Loudon took the Sharpless, and some others of the largest and finest known varieties and crossed them. The result has been the largest and finest berries known to civilized man.

IN BLUE EARTH COUNTY.

July 26th, in company with Mr. Harris, we left Rochester for various points in the southwestern part of the State. Our first regular visit was Mankato, a flourishing town on the Minnesota river. We have been wondering for years why Mankato made so little noise in the horticultural world, and we are reminded again that "still waters run deep." Nature has done her part, in my humble opinion, to make Mankato the garden of the State for all horticultural products at all adapted to any part of her large domain. My acquaintance with Mankato's horticulturists is extremely limited, but that there is leaven there that will soon ferment the whole mass, I am quite hopeful.

J. H. Vandervort writes Jan. 9, 1888: "Horticulturists of Minnesota, who have so many difficulties to overcome, will find that there is strength both in union and communion." The Mankato people will yet discover the wisdom in this remark from one of her leading horticulturists, and organize a local society there that will cause other parts of the State to look well to their laurels.

IN NOBLES COUNTY.

Mr. Harris will no doubt tell you of the many good things we saw at Mankato, so I will pass on to Worthington, a beautiful prairie town near Lake Okabena. Our principal object here was to inspect the choice seedlings of J. H. Ludlow. He has here one of the best bearing orchards in the State. We found Mr. Ludlow hauling off apples to market by the wagon load, and we estimated that there was still over two hundred bushels on the trees. I was astonished, and

immediately donned my thinking cap and inquired if we had been traveling east for the last day or two? When answered in the negative, I exclaimed: "But I was told that apple trees would not *produce apples* as far to the westward as this: how is it?" I refer you to Mr. Ludlow.

Will leave the particulars of this pleasant visit with Mr. Harris, who gave you such an accurate account of the situation in our last annual report. Will say, however, that Mr Ludlow's seedlings, viz: The Okabena, Daisy and Wax, surpassed my anticipations. They were all exhibited at our fair at Rochester last September, and took the first prize as the best collection of seedlings. How these varieties will behave when removed north from the south border of the State, and from Lake Okabena, this deponent saith not, but they are well worthy of trial.

It is not improbable, we think, that the Daisy should prove the most valuable; it is the best keeper, and carried the most fruit the present season.

IN COTTONWOOD COUNTY.

Windom was our next objective point. Here Mr. Dewain Cook met us and piloted us out some fourteen miles across the prairies to his well cultivated little farm, where flourishes in lavish abundance the Cook's Hardy Dewberry, which, I think, he prefers to designate the "Windom Dewberry." - How this plant will succeed on heavy clay soil, or timber land, we cannot say; but for the prairies, similar to that of Mr. Cook's, I very much doubt if it has an equal as to quality. I must say that it fitted my mouth so nicely that I soon became too full for criticism. At the time Mr. Cook brought this dewberry into notice, many planters had become discouraged in regard to blackberry culture, but it does appear as though this enormously productive variety must go a long way towards restoring confidence again.

Mr. Cook introduced us to some of the leading gardeners among the Mennonites and we endeavored to glean something new and valuable, if possible, in regard to the much talked of mulberry, and other plants peculiar to the Mennonites. We came to the conclusion that to buy Russian mulberry plants there, even at the low price of \$4 per one hundred (as we had done several years ago), would be a losing game, as it would be like a man's buying common seedling apple stocks for an orchard, as he would not stand a ghost of a chance to get a single tree of good repute. We found one man there who said

he had a mulberry among his seedlings that was of good size and quality. The tree looked hardy, and he had it layered, and promised us a sprout from it, which we expect to receive next spring. In this way, by careful selections from thousands of bearing trees, and then planting seeds from these again, in time we shall no doubt produce a large, fine mulberry, like the Downing Ever-bearing.

We found some of the Mennonites well up in grape culture, small fruits and vegetables.

IN DODGE COUNTY.

Next visited C. H. Pond and Alexander Houston, of Kasson, Dodge county. Mr. Houston has a seedling of the Duchess some fourteen years old. The seed was planted by Charles Gove, a former owner of the farm. The fruit is thought to be superior to the Duchess in quality, and a better keeper; cannot say just how long it will keep. Mr. C. H. Pond, if not the principal fruit grower in Dodge county, is fast tending that way. He has a native plum grove that produces a large amount of very fine fruit, perhaps fully up to the De Soto, Rolling Stone, and other cultivated varieties.

IN RICE COUNTY.

October 14th we visit the Peerless apple tree in Rice county. We first called on O. F. Brand, to have him show us the way, but he was out of town, and we had to find our way the best we could. J. G. Miller, the owner of the tree, gave us the following history of the Peerless: "Seedling of the Duchess; age, seventeen or eighteen years; has been transplanted once; stands on a common clay soil, with a row of willows on each side; its season is from about the first of November to the first of January." Mr. Brand has got all the sions so far. It has borne eight or ten bushels in one season, and the average about four to six bushels a year. We found other promising seedlings in this orchard, and Mr. Miller is to be congratulated for his success in growing seedlings. But I will not weary you further, as our chairman will doubtless give you a detailed report of the many good things found at J. G. Miller's.

REPORT ON SEEDLING FRUITS.

By G. W. Fuller, Litchfield.

I have visited the two seedlings referred to in my report last year, that of Mr. Mills in Greenleaf, and of Mr. Baldwin in Cedar Mills. The trees bore but little fruit. Two apples from the Mills seedling kept in my cellar until a few days since. The Mills seedling usually keep but a short time.

I put in grafts from both these trees last spring, and, after a few years, shall be able to say more certainly what they will do.

I am inclined to think we cannot decide on the real value of a seedling, until we have tried it by growing grafts.

I have had no opportunity to act with the other members of the committee.

G. W. FULLER.

LITCHFIELD, Jan. 17, 1888.

DISCUSSION.

Mr. Dartt. I would like to inquire of Mr. Sias on which side he found the windbreak, when visiting the Peerless?

Mr. Sias I noticed when visiting the tree that the orchard was protected from all sides.

Mr. Brand. Mr. President, I want to correct one or two errors in the description of the Peerless apple. In reference to the age of the tree, your committee took some facts from Mr. Miller's memory; I have something more substantial than that. In 1875 I made a plat of the orchard and a record of it, and numbered every tree. At that time, as he told me, the trees were six years old past, and I was of the opinion they were a year older still; he stated that they were grown from seeds of apples raised in 1867, as that was the year he had a large crop of apples, in another orchard, which I found confirmed by reference to the files of the *Faribault Republican*. He got his seeds from that orchard.

With reference to the condition of the tree as compared with the Duchess, I would state that in the year 1868 I sold Mr. Miller thirty Duchess trees, nearly all of which came into bearing, but they have all killed out except four or five which still remain of the original thirty set in the spring of 1869. He has planted a good many since, but the Peerless has produced twice as much fruit as any

Duchess of the same age, and its last crops have been its largest ones. The last crop it bore was between ten and eleven bushels, and the crop in 1884 was nine bushels. The Wealthys in the orchard have all killed out. I simply made these remarks because I made a statement last winter which did not appear in the record.

Col. D. A. Robertson, of St. Paul, was here introduced as the first president of the Society, he was asked to come forward, at the same time being greeted with applause.

Mr. Sias. Just a word in regard to the age of the Peerless apple. I have no doubt Mr. Brand is correct about its age. I have Duchess trees on my place that are twenty-three years old, and this Peerless tree is still larger than any of mine. In regard to the discrepancy in the amount of fruit produced, I don't pretend to know about that.

Col. Stevens. Mr. President, I would like to know if this tree is propagated generally, and has there been any fruit raised from it by propagation?

Mr. Brand. No, sir; I don't think there was any scions taken from the tree until a year ago last fall; there will be no chance for its being fruited for a couple of years yet. Another point I wished to mention: Mr. Harris states in his report that there are only three of the seedlings left in the orchard; there are six left. I got fruit from all of them a year ago last fall.

Col. Robertson here took the floor and stated that one of the most interesting topics to him was that of the feasibility of growing apples and forestry trees, their effect upon the amelioration of the climate, exposure, etc. When the Duchess was mentioned he was interested to know where it was grown and where it was grafted. He knew nothing of the Peerless. It was only by accident he had learned of this meeting, as he had supposed from a notice in the paper that the meeting had been postponed.

President Elliot said the notice had reference to the meeting of the local society here.

Continuing, Col. Robertson said that as soon as he discovered his error he hastened to come to this meeting, as he had certainly intended to be present; there was no organization in the State of Minnesota nearer to his brain and heart than that of the State Horticultural Society, on account of the good it could accomplish for the State and the Northwest. He had always attended its meetings when possible to do so. He inquired as to the origin of the Peerless, as he knew nothing of the variety.

President Elliot. That is a new seedling just being brought out.

Mr. Brand. It is a seedling of the Duchess, and is supposed to be a cross from the Talman Sweet.

Col. Robertson inquired as to the exposure of those trees that had been destroyed.

Mr. Brand said he would make a plat of the orchard, if desired. On the north side of the orchard was a row of willows and some cottonwood trees, not more than two or three rows on the north.

Col. Robertson said that would be insufficient for protection. He had tried experiments with seedlings for many years; a great many years ago he had his experimental grounds near the city, where he had expended much money uselessly, perhaps, but he hoped not. He had thought he had a sheltered spot, but a severe winter killed all of the seedling trees; others had tried to raise seedlings with the same experience.

He said that a Mr. Stewart, of Le Sueur county, had saved a few trees, perhaps, but not of great value. He had investigated where seeds came from, and in most instances learned that they were from cider apples. He had been informed by an eastern seedsman that his stock came from apples grown in New Jersey, Pennsylvania and Virginia; and when he saw the result the statement was confirmed. In those states the best apples were sold and the worthless ones used for cider, hence the worthless quality of the seeds. The old varieties of apples grown in New England were mostly seedlings. The Newtown Pippin originated at Flushing, Long Island. He had often visited the celebrated gardens and orchards in that vicinity, when a boy; he came to Ohio in 1838. He found the country there full of worthless seedlings, but a lot of grafters went through the state with their bundles of scions and soon transformed the orchards. In this way the Ohio farmers got their fine varieties. He knew of one man who went through the country claiming he could grow a dozen varieties from one tree, and it was no humbug, for it could easily be done.

Many men who could afford the expense had imported trees from England, and some from Germany, and by making judicious selections varieties of fine quality and flavor had been introduced.

Apple seeds obtained from the cider press were unfit to be used for planting. He had heard nurserymen say that the root did not affect the stock, but he could prove to the contrary. The Duchess would die when exposed, as also would most other varieties. He had been in Europe for some time recently, and had been studying this subject, as to the causes for the losses of trees, etc., with much interest. It

would be observed that any tree that was exposed to these northern winds would die the same as persons would perish when exposed to these cold blasts. The winds that prevail in the winter throughout Dakota, and south as far as Kansas, were too rigorous to be endured without some protection against them. He knew something about it, as he had slept out of doors on the prairie when the thermometer was 25° below zero; it was pretty hard to keep warm, even with fires. There was a great difference to be observed in the atmosphere where there was protection from forests. He had talked with ex-Gov. Marshall, for one, who was surveying for the Government some forty years ago, and who with others camped out in tents in winter in the woods, in Wisconsin and Northern Minnesota, while surveying. They managed to live without freezing; out on the prairies they would have frozen to death. This came in as sort of an episode.

Where the barriers to orchards are removed there is a decrease in the amount of fruit produced. He had noticed this fact at Vladimar, Russia, and the same thing is referred to in the reports of Prof. Budd and Mr. Gibb, who had visited that country. What was needed for the orchard was protection. The best protection, in his judgment, was that of evergreen trees and hedges.

Col. Robertson said he feared he was taking up the time of others, but felt great interest in these matters, as he had studied them very thoroughly. He had noticed that the Duchess was inclined to split from the graft, and recommended planting a large stone under the roots, which would cause the tree to throw out roots of its own. The same rule would hold good with other trees too tender for the climate.

He said there was no reason why people should become discouraged as to raising fruit. They were raising apples in abundance in Russia, and had the very finest kinds of winter varieties there, and he had taken pains to obtain some of the seeds which he had brought home with him. There were finer varieties to be had than we had yet tested here.

The Duchess, according to his investigations, was a Swedish variety. It had been taken thence to Germany and England. He had traced up its origin with a good deal of interest and patient research.

He had found this to be true, that in every country on the face of the earth there were seeds to be found which would produce the variety of plants that were best adapted to the particular region of country, such as would prove of the highest degree of excellence, and adapted to the climate of the particular country where the seeds originated.

From seedlings, and nothing else, good fruits were to be produced. The same law held good with the ancients, but the Greeks understood the process better than the Romans, as he could show by reference to books in his possession.

At a convention held in England some two years ago an effort was made to obtain information with regard to the adaptation of various varieties of apples to the different parts of the British Isles. It was there demonstrated that every locality had a different climate, and that different varieties were adapted to particular regions of country. He believed that animals were climatic, and plants as well; everything that grew on God's earth was climatic, and it was wonderful that it should be so, although we could not tell the reason.

He had heard of a delegate to a certain political convention who asked the question, "What are we here for?" That might be applied to us individually. We are here to take care of ourselves; we are here to subdue, replenish and beautify the earth.

Mr. Thompson. We have been talking about the Duchess of Oldenburg. I do not know of any such apple; we are misnaming it; there is no such variety in the catalogue. The name Oldenburg is given, but the other is a mongrel. The true Oldenburg is a Russian variety, and a general favorite throughout the district where it originated, as well as throughout the Western States, as shown by this report to which I have referred. I have here the historical accounts of some of our best varieties, and the Duchess of Oldenburg is not mentioned in the list, while the Oldenburg is. It is described as of medium size, round, oblique, yellowish red in color, quality good, season September, a Russian variety. It is a good apple. The tree "scalpers" have added to the name. I have on my grounds the Oldenburg proper.

I have heard of agents who have been around in Grundy county selling what is called the Winter Duchess. There is no such thing. It is what is known as the St. Lawrence, a very valuable apple. Why, one of your agents here representing L. L. May & Co., was down there and tried to humbug me into buying some of their trees, and I suppose would have agreed to sell me anything under the heavens, and would have given me some hazel brush claimed to bear peaches if I would have given him the order.

We, as horticulturists, should exchange ideas; work in harmony. There is not a man living that is too old to learn something from the interchange of ideas. The great trouble is we are apt to be selfish;

we want to act as a family of brothers. We are all working to one end, and should remember that in unity there is strength.

My name is Thompson. I have the champion seedling orchard of Grundy county. I believe that every man can raise fruit on their own farms if they will make the effort to do so, in a greater portion of Minnesota and most of Iowa. They can do this with proper protection by using our native seedlings and crossing them with the choicest Russian varieties.

I agree with Col. Robertson that the root does affect the scion; it will affect the flavor of the fruit if allowed to remain. It is best to get a tree on its own roots if possible. I never sold a tree in my life. I don't want to interfere with the business of those who sell trees. They should sell trees true to name, and then, I say, let the purchaser use a good deal of common sense, and investigate as to the kind of soil he has, the best locations, study the reports, and plant the varieties adapted to the soil and location, and they will succeed, and not till then. Above all things there is no use for people of Northern Iowa and of Minnesota going to the east of the Mississippi river, taking soft, woody trees, gathered up promiscuously, to be planted out here. My theory is to plant seeds of the best varieties of seedling trees, and throw away the worthless kinds. I have experimented with seedlings until I have more than a hundred distinct varieties in bearing in a single season, in a seedling orchard of a little over three hundred trees.

Col. Robertson stated that he had found from observation, where fruits were improved either in Europe or in this country, it had been by the cultivation of the best varieties and by the propagation of seedlings. The experiments that are made should be conducted by our agricultural institutions. The work was too expensive to be conducted by individuals. The results accomplished by our experimental stations would be more satisfactory than could be obtained in any other way..

REPORT OF COMMITTEE ON NATIVE FRUITS.

By O. M. Lord, Minnesota City.

In the production of native fruits, Southern Minnesota bears no comparison with that part of Wisconsin lying east of it, especially such fruits as have a wide commercial value, like cranberries, the va-

rious kinds of huckleberries and blackberries; and it is doubtful if we have a great amount of soil adapted to the culture of the two first named. The only places where our native fruits are indigenous is among the timber, on lands lying contiguous to the streams, and in the groves which are scattered here and there on the prairies. These lands are of limited extent compared with the area, but we can probably find upon them all the varieties common to Wisconsin, though the quantity is too small to be of great significance. Strawberries were found growing wild when the country was first settled, and where fields were left uncultivated for a year or two they were sometimes very abundant, and in some places still continue to be so; but the cultivated kinds have entirely superseded them for market, and also largely for home use.

One or two varieties of huckleberries are sometimes found upon the sandy table lands along the streams, especially if the soil be formed of disintegrated sand rock. But they do not appear as luxuriant and as productive in fruit as in a more congenial soil. The climatic conditions can not be materially different from those in Wisconsin near by, where they grow in immense quantities. The habit of the plant under cultivation, if it has ever been carefully observed, is not generally known, and as long as the fruit continues to be furnished to the markets in such quantities and at such low prices, no elaborate experiments in their cultivation will be made.

The cranberry, as a commercial fruit, occupies a very important place. There are a few marshes along the south side of the Minnesota river, but no great attempts have been made to improve them. Experience has shown that under good cultivation they vary somewhat in size and shape, but in quality and in habit of growth their character has not been changed from those found growing wild.

The subject of cranberry culture has occupied so prominent a place in horticultural works that it will not be here further discussed.

Blackberries are indigenous along the Mississippi bluffs, and in the groves of brush and timber throughout this part of the State. There are few localities, however, where they have grown in quantities sufficient for market, or where they can be relied upon to produce fruit annually; and, indeed, it has been rare in many places where the bushes grow, to find any fruit for several years past. These remarks may also be applied to the dewberry, though the dewberry is adapted to a greater variety of soil. It is found equally thriving on the light sandy soil, or heavy clay.

It is well known that these fruits have long been profitably grown

for market, and their cultivation is said to have improved them. Though the varieties in cultivation have been selected from superior wild ones, or from chance seedlings of marked character, so far as I know no choice variety has originated through cultivation alone.

Although they have been successfully cultivated in this vicinity for a series of years, without winter protection, the last few winters have shown that they are not entirely hardy here, which also probably accounts for the disappearance of the fruit of the wild ones.

Black raspberries were not found here till about the year 1864, or twelve years after settlement. They made their first appearance in the alluvial deposits along the streams, but have now found a home along the roadside, and even in the crevices of the rocky bluffs, and upon the uplands. They have repeatedly been transplanted to the gardens for cultivation, but the results do not seem to justify the labor. It is found that the improved kinds are hardier, more productive, and better in quality than any that have been brought to notice selected indiscriminately from wild ones.

Red raspberry bushes are often found in the hazelnut brush, and sometimes in other localities; but they rarely fruit here in a wild state, as the tendency of all of them is to swamp themselves with suckers.

In very moist land they have a little fruit, but it does not compare in size and quality to the varieties commonly cultivated.

Gooseberries, both rough and smooth, and black currants are quite common in the moist sandy soils near the streams, and here also is found the wild grape, often in great abundance. These are gathered in considerable quantities nearly every season and used in domestic wine making.

Highbush cranberries, the black haw, the thorn apple and wild crab apple are also found in similar locations. The fruits of all these are sometimes utilized, but no attempts have been made to improve them. The trees or bushes have been transplanted for ornament, or from curiosity, and they often thrive and appear to do well, and may all be made to serve some useful purpose.

We also have the Juneberry, the choke cherry, and a dwarf black cherry, mostly found on the soil of the valleys.

The sand cherry is only found on the gravelly prairies formed by the Mississippi river.

If there should prove to be an important truth in top grafting hardy stocks, to secure the production of fruit in this climate, the sand cherry may yet be found very valuable.

All of these are altogether food for the birds. Though the Juneberry is quite palatable it is rarely tasted, as it ripens at a season when the birds can find little else so desirable. It has been cultivated to some extent further south, and the plants offered for sale, but the birds are too destructive to make the fruit profitable.

Wild plums are quite common in the vicinity of timber, in thickets of brush, and along the margins of the smaller streams, or wherever they are protected from fire. The tree is entirely hardy, naturally and when cultivated, and flourishes in a great variety of soils, and bears fruit more abundantly than any other tree, and at the present state of horticultural work is attracting attention second only to the apple among the larger fruits. In the short time in which it has been brought to notice, it has been demonstrated that it can be hybridized or cross fertilized to an unlimited extent, and we have reason to expect as much advance in its culture as has been made in strawberries.

The following report was presented by Mr. Harris:

REPORT ON FRUIT BLOSSOMS.

By J. S. Harris.

Mr. President I find myself in a novel position as a member of the committee on fruit blossoms. I can see beauty in the flowers and utility in the fruit which follows, but I am not well versed in scientific botany; moreover, I do not know what you are expecting of me.

By referring to notes taken at the time, I find that on April 30th toads were out of their winter quarters, and blossom buds of the cherry and plum were nearly open

May 2. Cherry and plum trees in full bloom, and the buds of the rollingsone quite prominent. The stamens on the cherry appear well developed and filled with pollen. Weather warm and windy.

May 3. Morning almost cold enough for frost. Juneberry trees in full bloom.

May 6. The petals of the flowers of the cherry and plum are about all dropped. The rollingsone is in full bloom. DeSoto and common plums are commencing to open their blossoms. Weather quite warm again.

May 7. Pleasant, dry and very warm. Transcendent crab apples are commencing to open their blossom buds.

May 8. Clear and warm with strong winds. Transcendent crabs are in full bloom. Duchess and Tetofsky are showing considerable color. The blossom or petals have all fallen from the plum trees; also from the Juneberry.

May 10. Ground so dry we can scarcely plow. Duchess, Wealthy, and Tetofsky trees in full bloom and petals falling from the Transcendents.

May 13. Warm to hot. The bloom has entirely disappeared from all our fruit trees. It seems to us that we have never known them to hold their blossoms for so short a time. During the season of blooming the weather has averaged warm, the ground has been dry. We have had considerable wind and not very much dew.

May 15. Blackberries are commencing to blossom.

May 17. Blackberries in full bloom.

May 19. Black raspberries commencing to bloom.

May 26. Concord grapes in bloom.

RESULTS.

Fruit of all kinds appeared to set as well as usual, at least it commenced to grow and enlarge. In a few days the principal part of the plums had dropped to the ground, and none held on to mature except a few of the DeSoto. The young apples commenced to drop immediately, and continued to do so up to the twentieth of June; by that date the Wealthys were literally all gone; Duchess, with the exception of a single tree, but a few left. A portion of the Transcendents dropped about as bad, while a few trees produced a half crop. Tetofsky, Strawberry crab, Pride of Minneapolis and Montreal Beauty, matured full crops.

The raspberry and blackberry crop would have been good but for the drouth. Grapes were a large and good crop.

Query. Was the loss of the plum crop and the shortness of the apple crop caused by drouth or a failure of the blossoms to fertilize from imperfect reception of pollen on account of strong winds and dry atmosphere? I thing the latter. Why? First, in the town of Greenfield, Wis., two neighbors have a quantity of the cherry plum; in one case they are on sandy ground and exposed to the winds and the crop was a failure; in the other case they are on a moist, loamy soil and sheltered from all but southeast winds, and they matured a large crop of good fruit.

On my place the DeSoto, the only variety that matured fruit, were sheltered by other taller trees. The other varieties were exposed on all

sides. The most apples were produced on trees the best sheltered. I believe there is much truth in the old saying that when the blossoms hold long there will be much fruit.

J. S. HARRIS,
Chairman of Committee.
La Crescent, Minn.

REPORT ON RUSSIAN APPLES.

By A. W. Sias, Rochester.

Mr. President, and Gentlemen :

We are getting more large, fine fruit at the present time in Minnesota from trees of Russian origin than from all others. Then why find fault with the "bridge that takes us safely over the stream?" The silver leaved family that I mentioned in my report a year ago, of which the Autumn Streaked is supposed to be at the head, came through the severe drouth last summer without flinching, or curling a leaf. Mr. Peterson agrees with me that the Red Cheeked is one of the hardiest known sorts, and unsurpassed as to color, but as to its bearing qualities I am not so well advised, as I have but one tree, and that on the Hyslop stock. With me it has never borne well; it stands in grass and cares for itself. The Anis family still bids defiance to drouth or winter's cold. The Russian Green, Hibernial, Lieby, Rosy Little Turnip Apple, White Pigeon, Antonovka, Titovka, Grandmother, Enormous, Green, Yellow and White Transparent, and many others are still with us, and unless we get a temperature lower than 50° below zero, they are likely to be for a long time to come. But about the height of my ambition at present is to obtain a cross between the strong constitution of the Autumn Streaked, with its perfect foliage and fine quality of pulp, and some other Russian of good keeping qualities, red color and large size, like the Red Black. Also a cross with such an almost perfectly hardy variety as the Red Cheeked with the McMahon White, which I believe to be one-half Golden Russet and balance Russian. That there is money in this line of work I steadfastly believe.

REPORT ON RUSSIAN APPLES.

By Andrew Peterson.

I never had so much damage to my apple trees as I had last winter. I think the cause was first that we had no frost in the ground before the snow came, and next that my orchard is sloping to the south, so that when we had sunny days the sap was up pretty quick, and then in the evening it became very cold with a sharp wind before the sap settled down, causing injury to the trees.

My Wealthy trees, from three to six year old, were killed to the snow line, and in the spring were entirely dead. The same effects were seen with the Duchess, but not so bad.

As to my Russians, I find the Charlamoff was injured by sun-scald just as much as the Duchess, but the Hibernial and Ostrekoff's came out all right, and they are hardy enough for Minnesota always. No. 980, Pelikanoff, is a hardy tree with better fruit than I thought, but a scant bearer. No. 445, Romianka, is the hardiest of all the Russians, or any crab variety, but a poor bearer. I think the reason is that the tree is standing in the nursery now, with a long tap root. The Christmas apple and Winter Livland and Sweet Borovinka are no hardier than the Duchess of Oldenburg.

The Russians that I received from Prof. Budd are No. 10 Riga Stripe, No. 22 M. Blushed Calville, No. 387 Good Peasent, Antonovka, Red Anis, 382 Peter-hoff, No. 169 Green Sweeting, No. 4 M. Ostrokoff's; not the same kind as from the Department. All these varieties did not sustain any damage at all, and they seem to be hardy enough for Minnesota.

The next are those that were sun-scalded more or less, but not damaged in the top: No. 206 Czar's Thorn, 252 Aport, No. 14 M. Anisim, 220 Tilus Risur, No. 200 Rosy Repka, 502 Rambour Remette. No. 3 M. Lead apple, No. 28 M. Kluevskoe, 2 M. Hare Pipka, No. 469 Grandmother, but none of these I think will be hardy enough for Minnesota, anyhow but No. 2 M. and Aport.

And now as to these that are not hardy enough for Minnesota: No. 21 Karbooka, No. 58 Vincent, No. 1277 Voronesh Red, No. 210 Vinegrand, No. 413 Cross apple, No. 20 M. Kursk Reinette, No 5 M. Royal table. These above named I think are all too tender.

Longfield, Suso winter, No. 58 M. No. 9 M. and Zelenka are entirely dead.

The Russian pear trees were killed to the snow line, except one variety is living yet, but richly it promises to blossom next spring. The

Russian plums standing on the south slope were killed entirely, but those protected by the woods are all right.

Four years ago I imported sixty varieties from Sweden and the first and second years some of them came out all right. Last winter most of them were killed down to the snow line, except one variety, and that is just as hardy as any Russian, and as it is a long keeper in Sweden, I think a good deal of this tree.

As to other fruits I would report that last winter was a very hard one, and we did not have much fruit this last summer. The raspberries had a good deal of damage and very little fruit; the Turner came out all right and fruited well.

In Carver county there was no fruit last summer except some crab apples. Grapes bore well last summer at my place.

I have more of the Russian varieties that I have not mentioned here, but they are too young yet so I can't say anything about them.

WACONIA, Minn., Dec. 21, 1887.

FORCING HOUSES.

By J. S. Gray, Minneapolis.

Mr. President and Members of the Minnesota State Horticultural Society:

I enter upon this essay reluctantly, knowing that there are a number of men in and out of this Society whose experience is much larger than my own; but since those of large experience prefer to keep their knowledge to themselves, I, who claim to know but little, am willing to share that little with those who know still less.

Wishing to grow such vegetables as lettuce and radishes for winter and spring trade, our land being nearly level, we decide upon running our houses north and south, and while we concede that the east and west built house, with a one-slant roof to the south has the advantage of a more direct sunlight in mid-winter, and therefore warmer in day-time, we claim for the north and south house, span roof, a more equable temperature; the early morning sun in early spring and fall months strikes full upon the glass; at noon it strikes upon the ridge and obliquely on the rafters, making a partial shade; this shade decreases as the sun moves westerly, until due west is reached, when it again strikes full upon the glass on the west side of the houses. CONSTRUCTION: Cedar posts squared are set in the ground two feet deep and

four feet apart in line for the side wall; another row ten feet six inches distant for the other wall, and also posts for the end wall; the outside walls are then boarded up with common rough boards; posts sawed off at an angle in line with the ridge; tarred paper is then laid over the walls inside and outside; the walls are then boarded inside and outside with matched boards; a cap is then nailed on top of the walls on which the top or the rafters rest, the upper end of the rafters being nailed to a 2x4 inch ridge pole, the distance apart determined by the width of glass used.

The first two houses we built we used 10x12 single-strength glass, rafters ten inches apart. On the remainder we used double-strength glass, at a cost of about thirty per cent more; rafters one foot apart, and would not use single-strength glass on such buildings at any price.

Now comes a coat of paint over everything, and then the glazing. Lap the glass not more than one-fourth inch; if a large lap is made water will get between the panes, freeze, and burst the glass. We use six-ounce tinned tacks to keep the panes from slipping down, and fasten the lights down with glazier's points, driven in with a point driver, a little machine that will drive points as fast as the hand can move from one position to another.

For filling the crevices between the panes and rafters we use a composition made of one equal part, by measure, of putty, raw linseed oil and white lead, well mixed and strained, and applied with a rubber bulb, made especially for the purpose.

The inside construction consists of a bench four feet wide on each side, with a two foot walk down the center. The benches must not be built tight to the walls, but a space of at least one inch left between the wall and bench for the heat to pass up, this part of these houses being the most vulnerable to cold. Ten foot houses heated by steam for the growing of lettuce, require a coil of these one inch pipes to each four foot bench. Four one inch pipes to each bench will give sufficient heat for cucumbers.

HEATING.

The best position in which to place the pipes is not settled; years ago it was thought that bottom heat was decidedly the best, but time brings new ideas, and one of these new ideas is that natural heat, meaning sun heat, comes from above; also that experience in forcing houses teaches us that our weakest places in these houses is in our roofs just as soon as the sun goes down. For the purpose, then, of

warming the upper air, we run our main heating pipe the whole length of the house, hung to the ridge pole, then back in smaller pipes, either hung to the wall or under the benches.

Those of you who have read Peter Henderson's plan of building these houses with straw roofs, with no space between, if you will take my advice will not follow his example.

We have four houses running north and south, from 10 to 12 feet wide, with a space of 3 feet between the walls, and one 20-foot wide house, with 6-foot space.

After a snow storm we scrape the snow off the roofs into the alleys; in the narrow alleys we remove the snow and ice by hand; the 6-foot alleys we clean out with a horse and scraper.

The cost of such buildings is about \$5 per running foot for the 10-foot houses, and \$8 per foot for the 20-foot wide house, the capacity of the wide house being just double the narrow ones.

MANAGEMENT.

On the benches we place about six inches of soil well manured, finely raked and marked off in rows with a stick, through which we drive nails at the required distance apart, so that the lettuce plants will stand six inches apart from each other; in four or five weeks the crop will be ready for market; the ground is then dug over and two quarts of Minnesota Fertilizer Company blood and bones raked in on two hundred and forty square feet of ground, and another crop planted. Under the benches the ground can be used for growing rhubarb and beets and turnips for greens.

The growing of cucumbers in early spring will require a warmer house than for growing lettuce, and the vines should be hung to the rafters eight or ten inches from the glass, and will require to be kept fertilized by hand.

The modes of heating, viz: by brick flue, hot water, or steam, each have their advocates. A neighbor of mine, Mr. C. A. Smith, extensively engaged in floriculture, has tried all, and is firmly convinced that steam is the most economical.

Peter Henderson has tried all, and says he would not tear out hot water apparatus, but in all new buildings puts in steam. My opinion is that a combination of the two will prove best, using steam for winter, and for spring and fall, hot water.

The fuel needed for heating our six houses ran about two tons per week of coal during December, and as high as three tons per week during the late cold spell, or say an average of two and one-half tons

of coal at \$3.50 per ton, or \$8.75 per week. My advice to any person who wishes to build one or two houses only, would be to heat them with brick or tile flues, and that no man should use steam except in an extensive establishment.

REPORT OF DELEGATE TO WISCONSIN.

By J. S. Harris, La Crescent.

The summer meeting of the Wisconsin State Horticultural Society was held at Baraboo, Wis., July 20 and 21, 1887. The meeting of this society was something of a departure from the usual custom of holding it in the midst of the strawberry season, and it proved a very great success, as it was more favorable for securing a good attendance of the members and a fine exhibition of the midsummer fruits. The papers read before the meeting were ably written and full of life, experience and practical suggestions. The people of Baraboo gave countenance to the meeting by their presence, and every session was marked with a full house.

Liberal premiums were offered for the various varieties of small fruits in season, early and last season's apples, vegetables and flowers; and, although the season was thought to be unfavorable on account of the severe drouth that had prevailed, varieties were well represented, and the quality and appearance of most varieties was fine, demonstrating that some horticulturists had met with something besides "blasted hopes and disappointed expectations."

The varieties of raspberries shown were of blackcaps, the Gregg, Tyler, Souhegan, Nemaha, Ohio and Earhart; of reds, Cuthbert, Turner, Marlboro, Brandywine, Shaffer, Colossal; of yellow varieties, Caroline and Golden Queen. The Gregg and Souhegan were the finest of the black, and Ohio and Earhart the poorest. In reds the Cuthbert stood at the head of the list, although the Shaffer was the largest fruit, and Brandywine the most showy and in best condition; however, it did not seem to be a general favorite.

Blackberries were represented by Ancient Briton, Snyder, Stone's Hardy, Wilson Junior and Agawand. The Ancient Briton was the most extensively shown and generally the best fruit, while one exhibit of Stone's Hardy was very fine, one plate of the Wilson Junior was extra fine, and others were the poorest in the entire collection. I was informed that this variety was not as early as advertised, not

hardy, and very liable to bring imperfect or blighted fruit. Lucretia dewberry were larger and finer than the Bartlett, and promise to be more fruitful and better adapted for general cultivation.

Mr. Pepper made an exhibit of seedling apples that were grown in 1886, of medium size, fair quality and in good preservation. Other parties made exhibits of Duchess, Tetofsky, Yellow Transparent, Early Champagne, and a number of other varieties of Russian apples. The Yellow Transparent and Early Champagne were ripe and in good condition to test their quality, and if sufficiently hardy are of so good a quality as to be worthy of general cultivation throughout the Northwest.

A significant feature in all meetings of the Wisconsin Society is the prominent part taken by the lady members, and the papers read by them are becoming the most valuable horticultural literature of the day. Cannot we profit by the example of our Wisconsin neighbors and enrich the pages of our future reports with thoughts of the ladies of our own Society?

REPORT OF DELEGATE TO DAKOTA.

By A. W. Sias, Rochester.

Mr. President and Members of the State Horticultural Society:

This live and progressive institution for the dissemination of horticultural knowledge, the Dakota Horticultural Society, convened in the court house at Huron, December 13th, and closed its last session on the night of the 15th. The meeting was called to order at the proper time by President E. De Bell, of Sioux Falls, who presided with uniform fairness, and with satisfaction to all. It is fortunate for this society and the good cause it represents that it should be so well officered from the very commencement of its arduous duties. It was a most happy surprise to your delegate, on entering the hall where the horticulturists were assembled, to be brought face to face with four distinguished horticulturists of Minnesota fame, viz: H. H. Young, of St. Paul, a former well known editor of Rochester, and well known to your reporter as an uncompromising friend to horticulture. B. C. Benedict, a former partner in the Rochester nursery of M. W. Cook & Co., now of De Smet, and one of the few nurserymen in our section whom the tree planters felt that they could "tie to" as an honest man. Oliver Gibbs, Jr., who showed all nationalities at New Orleans, in

1885, that Minnesota was in the habit of "taking no back seat" in her exhibits of fruits and other farm products, was at this convention, and read an interesting and instructive paper on the Native Plum of Dakota. And last, but I refuse to say least of this horticultural quartet, was the genial, lively Prof. Chas. A. Keffer, of the Brookings Agricultural College, formerly of the Experimental Farm between St. Paul and Minneapolis. I am well aware that the word quartet is more commonly applied to regular musicians than to horticulturists. But I take nothing back, as these gentlemen were not wholly devoid of good music, although they sang solos, while the Farmers' Alliance in session at the same time in the adjoining room, indulged in vociferous concert or "congregational music." An unknown member just behind your reporter was heard to remark that "still waters run deep," which of course shows too much prejudice against a great people who stated, as they had a legal right to state, in actions which speak with more force than mere words, that they must divide the great Territory of Dakota, and know who was running the government there, before taking up any question of minor import, such as protecting their families from the relentless blizzard and tornado, with rapid-growing deciduous and evergreen shelter belts, etc., etc. Hence where the great majority of the Farmers' Alliance were sheltered on the night of the "joint session," "this deponent saith not."

Your reporter is no prophet, but it would appear to a stranger on first entering the Territory of Dakota, that arboriculture was a subject of second, third or fourth importance to her people when compared to the other well ordered industries of the country. But we need not despair, for there is leaven enough in the Dakota Horticultural Society to leaven the whole mass.

The first meeting of the Dakota Horticultural Society was held at Huron, Dec. 18, 1884, at which time a constitution and by-laws were adopted. The second meeting was also held at Huron, Feb. 4, 1885. The next at Parker in 1886, and the last at Huron.

Mr. Harris, in an able paper read at our county horticultural society's meeting, January 7th, speaks of Rochester as "historic ground," being the birthplace of the State Horticultural Society, its first and second meetings being held here. For precisely the same reason we must be allowed to speak of the beautiful city of Huron as "historic ground."

Mrs. L. A. Alderman, of Hurley, the late efficient secretary of the society, we regret to say, was kept from the meeting by illness.

All that is wanted to transform Huron into almost an earthly para-

dise, and render it the best location in the Territory (when divided) for the seat of government for the new state, is for the city to obtain in some shape two hundred or more acres of land west of the city, cultivate the same well for two years in some crop, then if money is an object, set with cuttings of gray willow, cottonwood, Russian poplar, or anything that will succeed best in that location, four feet apart each way, leaving room between this grove and the city for an arboretum. And when the trees become large enough, lay out drives through the plantation and convert the whole thing into a beautiful driving park. In this way the city can be protected in a few years from blizzards and tornados, and have "a thing of beauty and a joy forever" right in sight.

There is no two ways for the settlers on the "oceanic prairies;" they must protect their buildings on the west by shelter belts, or some one will some day "get hurt." The railroads might profit by this hint, and set trees on the west side of all depot buildings throughout all the prairie country they traverse. We can conceive of no better or more humane use for a small part of the cash received from their "watered stock." If they say, as the man did who failed in his attempt to get on board the ark at the time of the deluge, that they "don't think there is going to be much of a shower," and so take no heed, they will in that case "sow the wind and reap a whirlwind."

The election of officers Wednesday, the 14th, resulted as follows: President, E. De Bell, Sioux Falls; vice president, G. H. Whiting, Esmond; secretary, Prof. Chas. A. Keffer, of the Agricultural College, Brookings; treasurer, Oliver Gibbs, Jr., Ramsey; director at large, A. Wardell, Twin Brooks; for North Dakota, William Clausen, Bismarck; for South Dakota, H. C. Warner, Forestburg.

Where all the papers were especially fine it is not necessary to report on each separately. This was true with the above directors.

Leonard Gee's paper on "Experiments in Forestry" was handled in an able manner, showing conclusively that the writer had "been there" and knew whereof he spoke.

"Shelter Belts" by G. H. Whiting, Esmond. You will notice that this writer takes a subject as broad as our Western Prairies, and that he was master of the situation there was none to dispute. If time and space would admit of it, I should be pleased to speak more at length in regard to the rare merits of all the papers read before this convention—but there is one thing of vital importance to the rising generation that I must not neglect to mention here, and that is a resolution offered by Mr. Bushnell of Huron, proposing the appoint-

ment of a committee to devise measures for the general observance of Arbor Day. His plan was to issue a circular letter impressing upon persons having charge of churches, schools, and other institutions, and upon citizens of towns and villages the necessity of planting shade trees upon the grounds in their charge. Now "The Farmer" of St. Paul deals in good common sense when it says of this resolution: "No doubt a great deal of good might be accomplished by following out this suggestion, and that, too, at a trifling expense to each individual."

Were it not for the friendly and most liberal aid rendered the horticulturists by the agricultural press of the Northwest, our noble vocation would be "up hill" business when compared to its present status. This thought was suggested by noting the lively interest manifested in the Dakota Horticultural Society by the Dakota Farmer, not only at her last convention, but from the day of their organization up to the present time. And when I compare this friendly aid to similar papers in our own State, such as "Farm, Stock and Home" and "The Farmer," I perceive no lack of interest. These being facts that any man of ordinary intelligence can comprehend—then why should not every horticulturist in Minnesota aid the agricultural press of Minnesota with both pen and purse?

ANNUAL MEETING OF THE DAKOTA HORTICULTURAL SOCIETY.

By Oliver Gibbs, Jr., Ramsey, Dak.

As you will receive from A. W. Sias, who was present at our meeting at Huron last week, and who, by the way, was made an honorary life member, some account of the proceedings, I will leave to him the most that I had in mind as being likely to interest you

The meeting convened under depressing circumstances, the bill passed at the last session of the territorial legislature providing an annual appropriation to print the horticultural report and to pay the incidental expenses of the society, having failed to receive the governor's signature; and why his excellency had not signed it none of us knew. However, after being together a little while, it was found that the few present were willing to do the work of the meeting just as thoroughly as if an immediate publication was in prospect, trusting that next winter all would come out right, and the public then

have the benefit of the society's papers, correspondence and discussions, in the shape of a proper report.

On Friday, just after the final adjournment, President DeBell, Vice-President Whiting and myself happened to hear that Gov. Church was in town, and immediately we constituted ourselves a committee to call upon him, and forming in a revolving triangle, give him, one at a time, the three points of it if necessary, in missionary labor. Happily we found that the governor was not one of the unconverted. Our bill had failed for the sole reason that it lay too near the bottom of a big pile of bills that the legislature had sent him at the last minute of the eleventh hour of the session, and it went with a number of other important and meritorious bills that he could not get time to read at all before the adjournment—nobody having called his special attention to it, or taken any pains to acquaint him with the needs and plans of the society. Gov. Church is an ardent forester and an awakened horticulturist; and the committee, when they left him, carried his invitation to the society to come to him freely at the next session, or at any other time, and with the assurance of his appreciation and support of any suitable bill.

I mention this as an indication that in another year our society will be on an exchange basis as to an annual report, and to ask that our members may be furnished with the Minnesota Horticultural Report of 1888, to be sent direct by mail to the addresses to be hereafter given. I will remit the necessary amount for postage on the entire list upon notice from your secretary that the books will be sent.

There were two peculiarities of our meeting that I cannot forbear mentioning. One was the reports as to the different behavior of the same varieties of trees and plants as affected apparently by local conditions of soil in the district where planted. This was as marked as the well known varieties, between their growth under the known differences of climate in districts far remote in our great territory, and it shows how truly experimental is all our work over here; how much we have to learn of local conditions and adaptations, and how necessary is the horticultural society's work, to teach the people of Dakota what to plant that will suit the local conditions where they live.

Another peculiarity was the disposition to bring out for trial our wild fruits, shrubs, etc., and get into general cultivation such as are found useful. The Sheperdii, the Wahoo, the wild thorn, the sand cherry, the service berry, and even the wild gooseberry and the wild currant, and some dainty wild roses were mentioned, as well as our wild plums, which all our horticulturists are becoming deeply interested in. I

would add to this list our beautiful ornamental plant, "Snow on the Mountain" (don't know its botanical name), which is a common pasture weed in South Dakota. It seems to care nothing for drouth or neglect, and is beautiful in all situations; yet when allowed to stand in rich cultivated ground shows that it can respond as well as any other weed to such treatment.

We had a report from a reputable member who had seen it, of a wild plum on the Missouri that beats any native plum of the Northwest ever yet mentioned for size and quality. But as the wife's apron string, attached to the tree for a mark when it was found, had disappeared when our informant went back at the season for sprouts or scions, the identity of the tree was lost. There is hope that it will reappear again at another fruiting season. Mr. Sias can tell you all about this incident in our proceedings.

The next annual meeting will be held at Mitchell the first Tuesday in December, 1888, but there is a probability of a summer meeting in the time of strawberries and June roses, at Sioux Falls; at either of which we should be happy to meet any of the members of the Minnesota Horticultural Society. We have on trial, as reported by the members, a good large list of strawberries from which to gather an attractive exhibition, and the stand of plants is generally reported as very strong. Of roses, we shall know better what we have got when we come together. President De Bell reports a good rose of damask color that is as hardy as the wild rose, and blooms from June till autumn. Its name is *Rosa Ragusa*. We have never had any roses in our garden that were safe in all winters without covering, except the Scotch white and the old-fashioned blush, and these are the better for covering.

P. S. In a letter just received, January 8th, from President De Bell, I learn that there is a prospect of getting our report printed through the Commissioner of Immigration. The society is indebted for this to a suggestion made by Gov. Church, at the interview above mentioned at Huron.

Coldest temperature here this winter, thirty below zero. Plenty of snow. It fell during the last of November, and covers prairies, fields and orchards like a tight blanket. Ground froze rather dry, but thawed out in December under the snow, and absorbed plenty of moisture. Badgers were busy digging out gophers during the warm week in the middle of December, through a foot of snow.

President Elliot announced the following committees on award of premiums for prize essays, viz:

On orcharding and on grapes—E. H. S. Dartt, J. M. Underwood, and M. Pearce.

On strawberries and raspberries—A. W. Latham, O. F. Brand, and M. Cutler.

On blackberries and dewberries, and on currants and gooseberries—J. S. Harris, A. W. Sias, and Wm. Lyons.

The meeting adjourned until 2 o'clock P. M.



MINNESOTA STATE AMBER CANE ASSOCIATION.

ELEVENTH ANNUAL SESSION,

HELD AT MINNEAPOLIS, WEDNESDAY, JAN. 18, 1888.

The eleventh annual session of the Minnesota State Amber Cane Association was held at Market Hall, Minneapolis, on Wednesday afternoon, Jan. 18, 1888.

The Association met at 2 o'clock P. M., and was called to order by the secretary, Prof. E. D. Porter.

Prof. Porter said a letter had been received from Capt. Blakeley, of St. Paul, the President of the Association, stating it would be impossible for him to be present at the meeting, owing to pressing engagements elsewhere.

Vice President Day was called to the chair.

The minutes of preceding meeting were read and approved.

After a short intermission for reception of members, payment of annual dues, etc., the following paper was read:

IMPROVEMENTS IN MACHINERY AND PROCESSES OF MANUFACTURE.

By B. Densmore, Red Wing.

The first public expenditure of money under the direction of the department of agriculture for experimental work in manufacturing sugar from sorghum was made in the year 1885, at the Ottawa Syrup and Sugar Works, Ottawa, Kansas. The diffusion process was employed, and the results obtained were general in character. An extraction of ninety-eight per cent of the sugars of the cane was claimed, ninety-seven one-hundredths of which could be placed on the market either as dry sugar or molasses.

The Ottawa company was, however, a failure financially, and for the following year, 1886, the Parkinson Sugar Company was organized at Fort Scott, Kansas, and a commodious works or factory established as a nucleus in which the department could pursue experiments still further. The buildings, and to a great extent the machinery, for these works was furnished by the company, but the more important aids and fixtures, in the form of a complete diffusion battery, carbonatative apparatus, filter presses and vacuum pans, were furnished by the department of agriculture.

Almost, if not the entire, sorghum crop for 1886 tributary to Fort Scott was consumed at these works in purely theoretical and experimental work, concerning which Dr. Wiley, the United States chemist in charge, states in his official report as follows:

"In a general review of the work the most important point suggested is the failure of the experiments to demonstrate the commercial practicability of manufacturing sugar from sorghum."

Thus far upwards of \$100,000 of public money had been expended in these experiments, and with failure as the only acknowledged result; but the management of the Fort Scott company, having an abiding faith and being still possessed of undaunted perseverance, "made careful selection of the essential parts of the process already used, omitted the non-essential and cumbrous parts, availed themselves of all the experience of the past, and, in the season of 1887, attained that success which finally placed sorghum sugar making among the profitable industries of the country."

The experiments of 1886 were substantially an effort to adapt the juice of sorghum cane to the diffusion and carbonatative process, instead of which the process should have been so modified or changed as to meet the requirements of sorghum.

Diffusion and carbonatation are employed in Germany and France, and with great success, in extracting sugar from the beet root, but the process in full and as there employed is not adapted to the manufacture of sugar from sorghum.

This fact was recognized in 1886 by the Fort Scott management, and in 1887 they, having by experience learned what best not to do in order to treat sorghum juice successfully, were in a position of advantage, and prepared to derive all the benefits possible from the work which had been undertaken by the department.

The process of sugar making, as now developed is, briefly, nearly as follows: The seed tops are removed from the cane while yet in the field where grown. The first step at the factory is to separate the

leaves and leaf-sheaths from the cane. To accomplish this the cane is cut into short sections, and then run through a system of fanning mills the blast of air from which blows out all the light material. The cleaned cane is next cut into fine pieces or chips, and is then ready to go into a cell of the diffusion battery, where it is subjected to a leaching or soaking process with hot water. Each cell of chips is held under this treatment for sixty or seventy minutes.

The diffused juice is said to have taken up and to hold in solution ninety-eight per cent of the total sugars of the diffused chips, and to consist of about half a gallon of water to each gallon of juice obtained from the cane. Milk of lime is used in the usual manner for defecation, and the clarified juice is then evaporated in vacuum to a semi-syrup, and lastly boiled to grain in the large vacuum or strike pan. Under the most favorable circumstances the time occupied, from cutting the cane for cleaning, to dumping the strike of sugar or milada from the vacuum pan, is about twelve hours.

The encouraging results had with diffusion have fairly brought before the sugar industries of the United States the question of how best to extract the juices from the cane, whether by rolling or grinding in the mill, and thereby obtaining something over fifty per cent, or by diffusion, and thereby securing nearly all the sugars of the cane. It is already evident to practical manufacturers that the best quality and greatest quantity of product can be obtained from cane which has been thoroughly cleaned, hence the first and great desideration for the successful manufacturer is a machine which will do this work rapidly and efficiently, whether the juice is to be extracted by milling or by diffusion.

The advantages of diffusion consist mainly in the large extraction obtained thereby. Diffusion has, however, its disadvantages—first, the diffused juice consists of one hundred parts of juice from the cane to fifty or more parts of water added in the process of diffusion, and thus the relative cost of evaporation is increased nearly sixty per cent. Second, the exhausted chips or bagasse, being surcharged with water, have no immediate value as fuel. Third, the immediate and determined effect of diffusion is to completely destroy the normal character of the juice. At its best, as expressed by the mill, the juice is very unstable in its character and relative bearings. Fourth, diffusion extracts soluble solids and coloring matter to a great extent, and equally as well as sugar, and these, except such a part of them as may be skimmed off or precipitated, finally incorporate with the sugars, giving a heavy precipitate in a heated solution of the crystal-

izable sugar, or rendering the non-crystalizable sugar, glucose or syrup a black opaque molasses of rank flavor. Lastly the great cost of the diffusion plant places it practically beyond the reach of the average sorghum manufacturers.

The report of the Fort Scott works for 1887 shows an average product of 49 pounds of sugar and 10.6 gallons of molasses to the ton of field cane, and an average of $10\frac{1}{2}$ tons per acre, an average product of 523 pounds of sugar and 113 gallons of molasses.

The total products from four hundred and fifty acres are reported at 235,826 pounds of sugar and 51,000 gallons of molasses. The average for the season of the analysis of the diffused juice is two and ninety-five one-hundredths of sugar to one of glucose, while the ratio in product is one of sugar to two and one-half (nearly) of molasses.

In this connection the inquiry may not be impertinent as to the loss of sucrose which may be sustained by reason of inversion—a source of loss ably endorsed by the state of degradation established in the juice by the diffusion process, and which finds ample opportunity for accentuation in the time consumed after diffusion and before the grain is completed in the vacuum pan.

If we allow nine pounds of the above sugar to represent one gallon of molasses, we have on this account 26,203 gallons, or a total of 77,203 gallons of molasses (or syrup).

The fuel account for the amount of cane worked for sugar and syrup averaged, on this basis, thirty-five and one-third pounds slack coal, equivalent to nearly twenty-five pounds soft coal per gallon.

Reports from factories employing the mill and open pan evaporation instead of diffusion and evaporation in vacuum, show an average of thirteen pounds of soft coal used as fuel to the gallon of syrup made—a difference of nearly fifty per cent on account of fuel in favor of the mill and open pan evaporation. The highest coal bill reported from these factories is sixteen pounds of coal to the gallon of syrup made, or a difference of thirty-three and one-third per cent in the same direction.

Again, and from the same reports, the Fort Scott factory averaged sixteen gallons of molasses to the ton of field cane, having a market value of twenty cents per gallon, while the mill factories averaged twelve and one-half gallons of syrup to the ton of field cane, and having a market value of forty cents per gallon.

These figures cannot be taken as conclusive regarding the relative merits of the two methods under consideration,—milling and diffusion,—but they may be taken as an approximate index of what the method to be employed in the future will be.

The juice obtained by diffusion has not yet turned out a product equal in quality to that obtained by milling. Diffusion employs three very active agents or factors—time, heat and pressure, and with these affords a liberal opportunity for the full action of atmospheric influences. Milling employs but one agent—pressure. A careful examination of the statements made shows the relative bearings of these methods.

Briefly, milling with a much higher grade product than diffusion, while the latter furnishes about one-third more in quantity.

Diffusion is a long stride ahead, but it is self-evident that it is yet in a crude form. Whether it will be found practicable to materially reduce the amount of time consumed in the process, as well as the volume of added water and the amount of coloring and other matter extracted with the sugar, and whether the cost of the plant can be reduced to bring it within the ability of the average manufacturer to purchase, remains to be classed with improvements yet to be made.

Prof. Porter said he had hoped Prof. Swenson, the director of the works at Fort Scott, would be present at this meeting, but he had been detained by storms, etc. He had received a letter from him stating he had just returned from Texas, and had not received the letter sent him requesting a report of their operations there till it was too late to comply with the request. Prof. Porter described the process of manufacture of sugar and syrup there and at the works at Rio Grande, New Jersey.

By the process followed at Rio Grande they had secured one hundred and thirty-five pounds of sugar to the ton of cane this past season. With Southern cane the yield is about two hundred and twenty pounds of sugar to the ton. The Southern cane was ahead of the Northern, but when the question of seed and everything was considered, honors were about even.

He thought this whole subject of Amber cane culture had been conducted improperly in this State as an industry, and there was a departure from the objects contemplated when the Association was organized, some twelve years ago. They had heard of the old adage about spoiling a most beautiful horn in order to make a spoon. The object had in view was the manufacture of syrup for home consumption in Minnesota, an enterprise entirely feasible and not requiring much machinery. Too much attention had been given to experiments

in the manufacture of sugar, which required expensive machinery. The only way for the farmer to get pure syrup in Minnesota was to grow it on his own farm, take the cane to his neighbor's mill, and sit on the barrel till it was manufactured into syrup, for if left out of sight a single hour the barrel might be filled with glucose, since that article could be furnished at about one-fourth the cost of pure syrup from the cane. Here was the principal cause for a decline in the Amber cane industry in Minnesota for the past three or four years. Those most deeply interested in the business had been turning their attention to the manufacture of sugar. There was no question about our ability to make sugar, as it had been done by two persons in the room, who had made a success of its manufacture in a commercial way; but it was not worth while for farmers generally to undertake to raise their own sugar till they had succeeded in producing all the syrup that was needed. Half a dozen farmers could club together and grow Amber cane in sufficient quantities to make the manufacture of molasses profitable.

Mr. J. F. Porter of Red Wing was called upon to report as to his success with Amber cane. He said he had but few remarks to make on the subject. He had made about 4,000 gallons of syrup the past season, of which amount about four hundred gallons was of his own raising. He had made no effort to manufacture sugar.

Mr. Kenney was called upon for a report and a paper.

AMBER CANE INDUSTRY.

By Seth H. Kenney of Morristown.

Gentlemen of the Minnesota Amber Cane Association:

I have to state that some little time ago I received from an editor in the East, through Prof. Porter, a request for a statement of this year's work on Amber cane. Although I was a good deal hurried at the time, I sat down and wrote a brief statement. As I had been pressed for time I requested the report to be returned to me, and here it is:

MORRISTOWN, RICE Co., MINN., Dec. 1, 1887.

DEAR SIR:—Prof. E. D. Porter, of the State University, has sent me your letter which is full of practical questions, requiring, to be correct in answers, a first-class chemist, however I will give you some facts, using your questions as a basis for replies.

First—As to sorghum sugar. It has not been produced at a practical profit till the fall of 1885. This has been brought about by the in-

vention of John F. Porter, of Red Wing. A steam evaporator (for information address Densmore Bros., Red Wing.) on the principle that high heat long continued inverts the sugar. The pipes are of copper, and I made on one of them one and one half gallons of syrup per minute on Amber cane juice that tested by SAOH ten degrees of density, after defection and juice little below boiling point. Having excellent cooling facilities, this syrup by open evaporation, ran sugar of a good grain right from the coolers into the receiving tank, giving us the finest syrup in the United States, and that is saying a good deal. In proof I shall send a jug by express to you, Here is the secret: good ripe cane, thorough defection, rapid evaporation, rapid cooling. When made I put in 2,600 gallon tanks. The sugar forms in the tanks and settles, and we draw off the syrup; the sugar is at the bottom. We wait till the summer comes when thermometer is 85 degrees. We can drain this sugar 100 pounds to a batch in centrifugal and rewash the drained molasses.

Second—Average production has been so far as my experience goes four pounds per gallon of syrup. The cost has been with me to manufacture about six cents per gallon, not including drawing the sugar. I have not worked with special reference for sugar, but it will come without effort.

The market price the past three years has been 45 cents by the barrel and 50 cents by the keg, price of package added. Price paid for cane with seed cut off leaves just enough wilted so as not to extract green matter from them. The seed we feed to milch cows Boil and feed to hogs, making good pork; boiling to a pulp extracts the astringent properties. The bagasse we spread direct from the cane mill and when dry place in a rick or stack for stock of all kinds which do well on it. It must be dried well, and I consider it worth as much as timothy hay; never less than ten tons, average twelve and one-half tons per acre—have grown twenty tons. Never lost but two crops in twenty-seven years, and then not an entire failure. Surer than any crop I know of to give good returns. It cost me to grow forty acres cane to cut, top, and deliver it to mill quarter of a mile, \$1 50 per ton. I began September 1st, ended October 1st, only run day time. Run two mills, used about ten and one-half gallons of juice per minute for one and one-half gallons of syrup. If juice was poorer about seven gallons per minute for one gallon of syrup. To lengthen season plant some later; have to use care about frosts. Three degrees below freezing point cooks it some. The same cane cut up twenty-four hours before frost loosens the juice cells and prevents rupture, so it is safe

if cut soon enough, say by September 18th. In boiling seed, water should be hot, then put seed in; it will not burn on kettle then. I have answered your questions as near as possible. Should you wish to see what can be done I will send five gallons in new keg, on cars here, \$2.90 My crop is now more than half sold.

I have jotted down the following additional notes:

Eleven years ago the present month it was thought by quite a number of persons that the Amber cane industry in Minnesota ought to be encouraged, and to do this successfully required a State organization. The present condition of the industry is such that we can all work with renewed confidence. The reports from Fort Scott, Kansas, from Rio Grande, N. J., and from our own State, enable us to present evidence that this State, for quality of syrup and sugar, will compare favorably with any other state.

To give you anything like a report I shall have to refer to my own work. My former factory was made before we had learned the kind of buildings adapted to the wants of the work; so, early last summer, I planned and built four new buildings, with special reference for having everything in the right place. The results have proved it a paying investment.

The boiler capacity of the works is ninety-six horse power, the engine sixteen horse power. (This might seem to some out of proportion, but it was just right.) I run two cane mills, that furnished about ten gallons of juice per minute. The juice was elevated by pumps to two settling tanks, of three hundred gallons each, filling first one and then the other. As soon as I began to fill a tank I put into the juice about one-half the lime required for a good defecation. The object was to prevent the acids which come from the joints and sheaths from inverting the sugar.

This is in keeping with the work at Fort Scott, except that they placed the lime on the sliced cane. I have practiced this for many years, and think cane juice ought not to stand without being treated with lime. As we fill one of these tanks in thirty minutes we then commence to fill the other, so that when the juice is drawn into the deficators it has not usually stood more than thirty minutes to settle before going into the deficators. It goes from the tanks to the deficators. These are wooden boxes, $2\frac{1}{2}$ feet wide, $2\frac{3}{4}$ feet deep and $6\frac{1}{2}$ feet long, lined with copper. They each have a coil of two-inch pipe, fifty feet in length if straightened, which fill with steam and are provided with tight-fitting steam joints, so that by loosening two set-screws they can be taken out and quickly cleaned; and when kept in

good condition will heat three hundred gallons of juice in fifteen minutes, or about one-half the time it takes to grind the corn for that quantity. In these deficators the rest of the lime is added as soon as they are filled. It is then heated nearly to the boiling point, when the steam is shut off, and the thick blanket of vegetable matter removed. It is then allowed to remain quiet to settle the heavier portions which do not raise to the top. This juice is next run into a six-hundred gallon tank, and stored ready for the evaporators.

This storage tank holds the entire contents of the two deficators, and will last the evaporators one hour. I have mentioned this treatment of the juice before boiling. It comes to the evaporator nearly as clear as spring water, with the fodder taste taken out, which, for making first quality syrup, is absolutely necessary. Now we come to the evaporators, two of Porter's No. 3. They will boil six hundred gallons per hour into heavy syrup. I only use one at a time. Their capacity is from sixty to ninety gallons per hour of syrup, in proportion to the richness of the juice. The advantage of having two evaporators is in cleaning the pipes, which are of copper. We can change from one evaporator to the other without delay, which is all important when we consider ten minutes represents one hundred gallons of juice and the time of seven or eight men. I could say everything for this evaporator, for I owe my success in this business to it, and if I had twenty car loads of syrup I could sell it all at good prices. The business is now reduced to a perfect system, and both sugar and the finest syrup that is made is made with these evaporators.

We have brought samples of 8,000 gallons. I think the entire crop would give four pounds of sugar per gallon, and I feel that I can depend on the results with certainty. The seed almost pays the cost of cultivation. The work by steam requires much less fuel than by the old way of boiling. The demand for the syrup grows better. The past year we dried the crushed stalks, and all kinds of stock do well on them, eating them in preference to wild hay. I learn that most of the syrup, as made by the farmers, was bought up at from 25 to 30 cents per gallon, shipped to Chicago to sweeten glucose, sent back and sold to a wholesale house at about 30 cents, and retailed at from 50 to 60 cents.

There ought to be good cane works in every county to supply the home demand for syrup and sugar. It is a direct home trade. It saves transportation, and barrels of it can be exchanged for any kind of groceries. People will buy the pure article. I do not care for the glucose.

I do not know but I have trespassed on friend Densmore's paper on manufacture, but I could not have shown what a perfect system the industry is now reduced to except I had followed it through.

ELECTION OF OFFICERS.

The Association proceeded to the annual election of officers for the ensuing year.

On motion, the present list of officers was re-elected, viz.:

President—Russell Blakeley, St. Paul.

Vice President—Ditus Day, Farmington.

Secretary and Treasurer—Prof. Edward D. Porter, State University Experimental Farm, St. Anthony Park.

Executive Committee—Russell Blakeley, Ditus Day, Prof. E. D. Porter, Seth H. Kenney, J. F. Porter.

THE HONEY INDUSTRY.

It was suggested that a few moments be given to discussion on the Apiary, and Mr. Wm. Danforth, of Red Wing, was requested to come forward and address the Association upon the subject.

Mr. Danforth exhibited some fine samples of comb and strained honey in frames and glass jars. He said:

MR. CHAIRMAN: I don't claim to be a bee or honey man, nor to understand the business very well. I have been too much occupied with other kinds of business to make the subject a study, but I think the honey industry a very important one. Although we have to search around considerable to find a competent bee man, we have such a person present in the person of Mr. Urie, who can tell you much more than I can on the subject.

The first swarm of bees he had anything to do with was when he was a boy of thirteen years, when he had followed a stray swarm some three-quarters of a mile and succeeded in saving it. They were taken home, and in two years when he left home he had quite an apiary. He soon found that it could be made a remunerative business. Year before last, he said, we had a ton and three-quarters of honey, and about a ton the past season. He had not been at home to give them any attention except about twelve days, the care being bestowed by his wife and hired help. It was a rather poor honey season this year.

His method was to work the bees for honey; to control the bees and

compel them to make honey, and at the same time to increase the stocks. Last year his honey at current prices was worth \$600.

Mr. Wilcox. I would like to ask how many swarms you have?

Mr. Danforth. I put forty-one swarms into my cellar.

Mr. Hillman. How do you manage to keep them from the frost?

Mr. Danforth. I keep them in a cool and dark place. They are kept quiet from the beginning of the winter till the end.

Mr. Dartt. Do you use moveable frames?

Mr. Danforth. Yes, sir; I have but one kind of hive, and that the old-fashioned kind; there are twenty-eight sections in a case for the surplus honey, and when a case is filled we slip another one under until the top case is filled.

Mr. Dartt. How do you manage your queenless colonies?

Mr. Danforth. We get another queen to supply the bees; we use Italians as much as possible. It is impossible to keep them pure. I think the natives perhaps finish up their honey in the best shape, but the Italians make the most honey and are the most profitable if kept pure.

Mr. Mitchell. What do you use for pasture?

Mr. Danforth. Mostly clover, of which there is an abundance on the Mississippi bottoms, as well as other flowers.

Prof. Porter. What kind of honey is the best in quality?

Mr. Danforth. White clover and basswood.

Mr. Mitchell. Which do you prefer, natural or artificial swarming?

Mr. Danforth. I think most of natural swarming. I think they are the most successful. You can keep them back with the extractor.

Mr. Hillman. Do you extract the honey, or remove the cases?

Mr. Danforth. That depends upon circumstances. It pays best to extract the honey. It is estimated that it takes about twenty times as long for the bees to make a pound of comb as to make a pound of honey. We extract the honey by using the moveable frames, and the same frames can be used three or four years. But I will give way to Mr. Urie, who knows more about this subject than I do.

Mr. William Urie, of Minneapolis, was then called upon to address the Association, and came forward and said:

REMARKS OF MR. URIE.

Mr. President and Gentlemen of the Amber Cane and Horticultural Societies :

I have made apiculture a study for the last forty years, at least a good deal of the time, and yet with all this experience I have not fully mastered it. There is a good deal to be learned, and it is one of the greatest studies we have. I claim that it is one of the greatest insects that has ever been given to man,—the honey bee,—and perhaps the least understood. The reason why so few are engaged in the industry I do not know, unless, as the Irishman says, “The bee has a warm foot.” [Laughter.]

There was no trouble in getting along with bees with proper treatment. The first swarm he ever owned was down in Vermont, and he traded a tub of maple sugar for the swarm and hive, with a corncob stuck in the the top of the hive. In those days honey was obtained by the use of brimstone, but those days had passed away.

The proper way to handle bees was to strengthen the weaker swarms from the stronger colonies, which should be done from the first to the tenth of May.

He described the method of dividing the swarms. He had kept from two hundred to three hundred stands at one time, and had experience in the business in the states of Vermont, Illinois, Virginia, Maryland and Minnesota.

When he came to this State he brought fifteen colonies, which were increased the first year to forty-eight, which yielded him 1,500 pounds of as fine box and strained honey as he had ever seen. He had taken a box of honey with him on an eastern trip, which had been pronounced by experts the finest they had ever seen. Minnesota was as good a state as any other in the union for the production of honey.

Most of the honey produced in this vicinity was from white clover. The sample exhibited by Mr. Danforth was made from different flowers, and therefore he had an advantage in producing honey of very fine quality. His apiary was located at 2,520 Bryant avenue north. He had built a house for the protection of his colonies of bees, which was 12x24 feet in size, and was so constructed as to be as frost proof as possible. There were four air spaces, and the house was so constructed as to prevent dampness, and he had no trouble in keeping them through the winter without loss.

Anyone going into his bee-house at the present time would find in the coldest weather the bees apparently asleep, and consuming very

little honey. And they would remain there at the proper temperature until March or April. It was necessary to keep them dry and warm, and if the house was properly constructed, with sufficient air spaces, it would never freeze—not even potatoes. There was nothing like dead air spaces to keep out cold.

A great deal had been said and written about the bee moth destroying bees, but the method of preventing their ravages was as simple as A, B, C. There never was a swarm destroyed by them that was good for anything. It frequently occurs that a colony loses their queen. In passing into the air to be fertilized the queen not unfrequently gets into the wrong hive and is instantly killed, soon leaving the swarm minus any eggs and minus any young queens. As a consequence in four or five weeks, if we do not take the honey the millers will. The proper course to pursue is to introduce a new queen, which is easily accomplished; and in a period of fifteen days the colony will be supplied with a new queen. A queen had been known to lay three hundred thousand eggs in twenty-four hours. It is very interesting to observe their habits. The queen does not feed herself, but is fed by the bees, and requires a good deal of food while laying. He said there were a great many patent hives, as well as a great many theories with regard to the best method of raising bees. The Langstroth hive was the best. It was convenient for handling the honey or controlling the colony. A single swarm should furnish from fifty to ninety pounds of box honey. Bees increase faster in a cold than in a warm climate.

He considered artificial swarming the best, and the process was a very simple one. There was always something to be learned in the business. He could take as much profit from fifty good swarms of bees as could be obtained from fifty good cows, and was not afraid to try it with anyone. He would not agree to do it every year, as there are poor honey years, but in an average year he could do it every time.

Amber cane was no doubt a good thing, but he preferred honey to Amber cane syrup, as being finer and a greater luxury. Honey could be produced with profit at ten cents per pound. He was fortunate if he could get twenty cents for his box honey, and he never had a poor article. When nice white comb honey sold for less than eighteen to twenty cents it was not a profitable business, and it ought not to bring less than that price. But strained honey at a shilling a pound ought to satisfy anyone.

He had been very much entertained with the remarks on the subject

of Amber cane, and also with the topics discussed by the Horticultural Society. He was much interested in tree culture and everything in the fruit line. He had raised four acres of Amber cane in one year. That was twelve or fourteen years ago when we had no improved machinery like we have now, therefore the experience would not be of much benefit in that line. The Amber cane syrup that is now made is very fine indeed. He hoped the industry might be greatly developed in this State. Thanking you, gentlemen, for your attention, I will not take up any more of your time.

Prof. Porter. I want to say a few words on this bee question. I am also from Vermont. I commenced the growth of bees, and had the fever badly about thirty years ago. I got it from Mr. Langstroth. I lived almost next door to him, and I took my lessons in apiculture from him. I prosecuted the business quite successfully for some five years, and I think of all the hobbies I have ever had, I have derived more real enjoyment from apiculture than from anything else. There is more in the management of bees to interest a man, whether he is a scientist or not, than almost any other industry I know of. The whole economy of the hive is something truly wonderful, and it is something that is constantly stimulating investigation from the very first time the bee takes its flight in the spring, until it goes into winter quarters in the fall.

I concur in what has been said on the subject, but I wish to approach it from another standpoint, and that is the horticultural. When passing through the State, I have found thousands of acres of white clover scattered here and there, and apparently hundreds of acres of blossoms where there was a single honey bee. If it had been in Pennsylvania, New Jersey, Delaware, Maryland or Virginia, in such fields you would have seen swarms of honey bees buzzing around you, gathering nectar from these thousands of flowers. This surprised me. Then again, when I have come to look at the fruit trees that have been planted out covered with blossoms, I have wondered why there were not more bees kept for the purpose of accomplishing complete fertilization. And I have often thought that perhaps one reason why we did not succeed better in fruit culture was because we had neglected the development of the bee industry.

We have plenty of pasturage for bees here in this State, and I hope this coming season there will be an effort made to greatly develop this branch of farm industry for the benefit of the people generally, and especially in the interests of horticulture. It seems to me that if more attention was given to the business it would tend greatly towards making Minnesota a fruit-growing State.

Mr. Pearce. I was engaged in bee culture for some fifteen years in Minnesota, and I think they are very nice for those who understand them. I think the bumble bee and the hornet are our best friends. The common bee never works on red clover. We should never destroy hornets, yellow jackets or bumble bees, as they are the agriculturist's best friends. It is the general practice to destroy these insects, but it is an error altogether.

Mr. Wilcox Mr. Chairman and Gentlemen: I did not intend to say a word on this honey subject, but you have touched on a tender spot, as I am also from Vermont. I consider that this, in connection with horticulture and fruit culture, is one of the most valuable as well as most pleasant occupations in which we can engage. I brought some twenty-eight swarms of bees to this State with me a short time since, and I expect to make a success in the industry. I believe thoroughly in trying the best, as much as I would in any other stock. I believe in artificial swarming. Many authorities have condemned it, but results show that it is the best. There is hardly any subject about which the general public are so ignorant as they are of the good and bad qualities of the honey bee. About eighty per cent of the honey is composed of pure glucose—in its pure state one of the best sweets we have.

Mr. Dartt. Mr. President, it seems to me Vermont is pretty well represented. [Laughter.] I want to back up the theory of my friends, that the bees are friends to the fruit grower, but I wish especially to confine it to the hornet. I think the hornet is a decided success in that direction. Now on one of my apple trees there was a very fine hornet's nest, and it had also about a barrel of very fine apples, of which I dare say I should not have had any left if it had not been for my friends, the hornets. [Laughter.] One of these prowlers came around who are accustomed to robbing orchards, and when he saw those fine apples he could not resist the temptation to take one or two. He got the apple and the bees got him, and the way he tumbled and rolled in the grass was decidedly amusing. I therefore vote in favor of the hornet. [Laughter.]

Mr. Wilcox said he regretted there was not a bee keepers organization in the State, in order that this subject might be fully discussed, and that it might receive more attention than was being given to it. He was satisfied that the lack of bees had a marked effect in the amount of agricultural and horticultural products produced from a lack of fertilizing, which was accomplished by the presence of the bees; although he thought perhaps they could not work on red clover.

Prof. Porter claimed that the Italian bee could fertilize red clover. This species was better than the ordinary black bee, as it worked earlier in the day and later in the season. He thought bees were horticulturists' best friends

Mr. Wilcox said that Italian bees were very much like new strawberries, that did very well to advertise and sell, but most of them would fall back upon the Wilson in the long run. It was the same with Italian bees; among all the importations there was nothing superior to the common black bee.

Prof. Porter said he was thankful for the illustration as to the Wilson strawberry. Of all the new varieties that he had tried during the past twenty-five years, it was about the best, and there was probably a thousand quarts of Wilson grown for a single quart of any other variety. But he believed in Italian bees. For ordinary purposes the black bee would answer, and if not protected the Italian would degenerate and the black bee would take possession of the ground.

Mr. Urie said in regard to the Italian bee, that if it had not been introduced black bees would have gone by the board, and it was the salvation of the business, and no mistake. He was not selling Italian queens, but he handled them altogether, and had been doing so for years. He had some doubt about their fertilizing red clover, unless it was the second crop.

Mr. Hillman inquired if there were any objections raised to the keeping of bees in cities.

Mr. Urie said he now had one hundred and fifty-eight colonies at his place of residence at North Minneapolis, and had heard no complaints from any of his neighbors. If people disturbed them they were liable to be stung, but he had experienced no difficulty whatever. In Aurora, Ill., where he had one hundred and seventy-two colonies, a few of his neighbors had undertaken to have them removed from the city. They petitioned the common council to remove them, but the members of that body took the position that they had no more right to interfere with a man's private business in that way than to take away one of his horses or other personal property. He said Italian bees when aroused had stingers and knew how to use them, but when properly managed were as tractable and quite as little trouble as a lot of sheep. Bees had an aversion to horses and could not endure the smell of ammonia.

Prof. Porter said most of the difficulty experienced in keeping bees in cities was occasioned by the odor from horses, and being brought in contact with them. They should not be hitched too near them.

Mr. Pearce had kept bees in the city, and thought a serious objection to them was the damage they did in alighting on clothing hung to dry.

Prof. Porter said as a rule bees will deposit all their excrement within a short distance of the hive. This difficulty would only be observed in the spring of the year.

Mr. Danforth said they hung their clothes near the apiary, and never had any difficulty of that kind.

Mr. Urie said the objection referred to applied only to the first day's flight in the spring. Some people find fault without reason and condemn the whole honey business without any good grounds.

Mr. Hillman said he did not hail from Vermont, although when a boy he used to look wistfully at the wonderful mountains of that State from the hills of Washington county, N. Y., where he took his first lessons in bee culture. It was a profitable business, and he had been much interested in the discussion of the subject this afternoon.

Prof. Porter here suggested that the Amber Cane Association should unite with the State Horticultural Society. There was no sufficient reason for maintaining separate organizations. This subject of Apiculture and Amber cane culture might just as well be considered in the meetings of the Horticultural Society as to maintain separate associations. The time had come when they could profitably consolidate.

Mr. Kenney felt very kindly towards these industries or any other that would help promote the interests of the farming classes, and thought the suggestion of Prof. Porter a good one.

Mr. Harris said he saw no objection to uniting the two societies. It might have a tendency to add strength to the Horticultural Society, and as he was a thorough horticulturist he did not wish to oppose it. It might be well for the officers of each association to consider the matter and take such action as was necessary.

Mr. Elliott moved that the matter of uniting with the Horticultural Society be referred to the executive committee, which was carried.

Mr. Dartt said he felt inclined to favor the bee men, and was a friend to the honey bee. Bees were good fertilizers of the flowers. Why not arrange so that the bee men could come in with the Amber cane growers every year?

Mr. Wilcox. And why not add maple sugar?

Mr. Dartt. Let us have everything that is sweet, but perhaps we can save the necessity of having a bee association.

Mr. Harris. Horticulturists will certainly favor the honey bee, as it has an important office to perform in the fertilizing of fruits.

On motion of Mr. Dartt the meeting of the Association was then adjourned.

AFTERNOON SESSION.

WEDNESDAY, JAN. 18, 1888.

President Elliot stated upon the adjournment of the Amber Cane Association that the business of the Society would be resumed for a short session.

It was decided to take up the subject of forestry. Following is the paper prepared by Mr. Smith upon the topic:

THE STATE FORESTRY ASSOCIATION.

By C. L. Smith, Minneapolis.

Mr. President, Ladies and Gentlemen of the Minnesota Horticultural Society:

Your Secretary has asked me to say something about the work of the State Forestry Association. We have very little that is new to report. The appropriation made in 1883 was only partly expended; 10,000 copies of the Forest Tree-Planter's Manual, prepared by Mr. Hodges, were printed, and nearly all have been distributed.

A bill was presented to the last legislature asking for an appropriation of \$3,000 for the Forestry Association, but it failed to become a law, and consequently we have had no money to do with. If we had received the appropriation the board of directors intended to publish a revised edition of the manual for general distribution, and to have kept the secretary busily engaged in the work of collecting and disseminating information on the subject of forestry. Although we have had no money, we have done something for the forestry interest. During the year 1887 nearly 1,000 copies of the manual have been distributed at farmers' institutes, county fairs and through the mails. I have answered over four hundred letters of inquiry from planters, or those who contemplated planting. I have written over two hundred articles on the subject for the various news and agricultural

papers, and delivered over one hundred public addresses on the subject of tree planting. There is every reason to believe that these efforts have done something towards stimulating intelligent planting and cultivation of trees.

From one county we have reports of over 20,000 evergreens planted last spring; and although the drouth was severe and long continued, the young trees were so carefully handled, so well planted and cared for that over seventy-five per cent of them are alive and looking well. In another county, one prominent farmer became so interested in the tree talks at a farmers institute that he concluded to plant an experimental belt of evergreens, and purchased from a reliable dealer 1,000 each of white pine, Scotch pine, Norway spruce, white spruce and arbor vitæ. He reports, November 1st, 80 per cent of arbor vitæ and spruce, 60 per cent of white pine and 40 per cent of Scotch pine alive. I questioned carefully as to some cause for the excessive failure of Scotch pine, but failed to get any information upon which to base a conclusion. However, as a whole, he is well pleased with the venture. The trees were well mulched and are in good condition to stand the winter. He will add another 5,000 trees to his plantation this year, and replace all that died from last year's planting. The following directions were given him for planting, and he says he followed them in every detail:

Carefully prepare the ground by deep plowing and thorough harrowing; unpack the trees in a cool, shady place; wet the roots; while planting, carry them in a pail half filled with muddy water; open a furrow eight inches deep—only one furrow at a time, so the soil will be cool and moist; set the young trees about an inch deeper than they grew in the nursery; straighten the roots; work the earth closely around them; pack it firmly; never let the sun or wind reach the roots; keep cool and moist until planted; cultivate after, but shallow; let no weeds or grass grow; do not let the surface get hard; if for any reason frequent cultivation cannot be given, mulch with coarse manure, straw or hay.

I traveled over a large part of the State during May and June, and visited many newly-planted tree plantations. The rage for Russian mulberry and hardy catalpa seems to have subsided. Willow, cottonwood, ash and box elder are the principal varieties planted. I have no hesitancy in saying that for the purpose of fuel or shelter from winds, the white willow gives the quickest and most satisfactory results. The demand for young trees for forest planting has exceeded the supply, and I believe all our nurserymen and tree growers have

found a market for their entire stock each year. I am also well satisfied that planting and cultivation is being carried on more intelligently than in the past.

In looking over the cellars and packing sheds of prominent dealers, I find them exercising more than ordinary care in storing and handling stock, with an evident desire to get the stock to the planter in the best possible condition. Such a method of business is worthy of commendation, but I am sorry to say that in some cases there was evident carelessness in handling stock, a disregard of the interests of the planter that should be classed with highway robbery. Evergreens, young tree seedlings, berry plants, etc., stored in compact masses, until heating, fermentation, mold or rot had destroyed a considerable portion; exposure for hours to the direct rays of the sun and to drying winds without protection of any kind, still further injured them. They are sometimes packed in bundles with very slight covering, or in boxes with moldy straw, and are dead or dying before they leave the nursery. We cannot too severely censure such methods, which rob a man of his money, and destroy his interest in tree planting.

Again, when the dealer had faithfully performed his duty and the trees reached the point of delivery, they were destroyed through the carelessness of the planter. Think of trees laying in a wagon box in front of a saloon or grocery store for half a day, without so much as a blanket or sack to shelter them from the sun and wind; then carried home, left in the wagon over night, or thrown on the ground and left to be carelessly planted the next day, where they carry on a losing battle with weeds and drouth, till they give up what little life is left them.

The intelligent and practical information gathered and distributed by the Horticultural Society, the Forestry Association, our able agricultural press and the Farmers Institutes have borne fruit; and good seed has been sown which has not yet germinated. We are certainly improving, many planters are eminently successful, but the field is large, failures are yet too common, our forests are disappearing too rapidly, and farmers do not sufficiently appreciate the advantages of timber.

One careful farmer who has a grove of 1,000 Scotch pines, mixed with deciduous trees to the north and west of his farm buildings, now sixteen years old, and which cost originally \$10, claimed that they had saved in the item of feed alone over \$100 per year for the past eight years. He keeps an average of one hundred head of stock. Anyone

visiting his barnyard during such a blizzard as we had last week would have no reason to doubt his statement.

Driving over the prairie during a recent storm we came suddenly to leeward of a double row of arbor vitæ, ten years old and about ten feet high; the thermometer might not have shown much difference, but nose and ears indicated a wide variation in temperature between the shelter of that slight windbreak and the open prairie.

A man is asked to improve his cow or horse, manure his fields, rotate his crops, plant small fruits, take better care of his garden, and he will respond with interest, for the benefits are immediate, the results apparent in a year or two at the farthest. Then the benefits are all his own, the interests his own, and he is easily induced to investigate and make use of improvements. But ask him to plant a timber plantation. He replies that it takes too long to get results—talk about climatic influences, that is everybody's business; danger of exhausting the timber supply of the country—there will be enough for this generation, let the next one look out for itself. Tell him that gang plows and gang saws will make a desert of the United States in one-hundredth part of the time it took to destroy Syria, he replies, let him who inhabits the desert look out for that.

Forestry, to be successful, to be widespread, must be the protege of the State. The interest is too great, the stakes too high, the individual too selfish, the profits too remote, the climatic and sanitary effects too important and the benefits so universal, philanthropists so scarce, that the State should immediately take hold of the matter and do something definite, practical and extensive.

All the governments of Europe are moving in this matter. Timber plantations are held, mature timber is removed under the direction of a State officer, the growth of young timber is encouraged, land that for any reason is unprofitable for agricultural purposes is planted to suitable timber, schools of forestry are maintained, and men are educated in all that pertains to the subject.

A bill regarding the setting aside of land sold for taxes, or such other land as may come into the possession of the State for timber purposes and relating to the care of such timber, its cultivation, cutting and sale, was prepared and submitted to the last legislature, but the reception it received was not very encouraging.

That we must eventually adopt some such system as that now carried on in Germany, no one could doubt if they have ever given the subject any thought. The earlier our people accept this as a fact and act upon it, the better for commonwealth and individual. The preserva-

tion of existing forests, the multiplication of timber plantations, an increase of evergreen belts on the farms, more trees along the roadsides and about the farm houses, are all questions of public interest. Anything that will increase the interest in tree planting, and give intelligent directions to all efforts in that line, are of value to the general public, and should receive the encouragement and hearty support of all good citizens.

The law under which bounties are paid for the cultivation of timber is a step in the right direction, but there are some defects which should be remedied by amendments. The Forestry Association should be provided with sufficient funds to employ at least one man constantly in the work of investigation, experiment and instruction. Whatever of value is known or learned should be put before the people, and every available means utilized to stimulate and encourage the planting of timber plantations and windbreaks.

The Farmers Institute is a medium through which much may be done to further the interests of horticulture and forestry. I have already referred to some of the reasons why the average farmer is not easily interested in forestry. Of course, from my standpoint, this seeming indifference to so important a subject only emphasizes the urgent necessity for pushing the subject before them. We find that when the subject is properly presented it never fails to interest, yet it is sometimes difficult to find room for it at institutes.

For three years I have endeavored to make use of Arbor day as a means of calling attention to and inciting an interest in tree planting among the country schools. The success has been very gratifying, and last spring I succeeded in interesting the city schools of Minneapolis, and the day was celebrated by the planting of trees on the school grounds, with appropriate exercises, including readings and recitations by scholars and teachers. I hope to have more time this year, and by enlisting the county superintendents and others, secure a still more general observance of the day. Before we can have a satisfactory state or national system of forestry, we must have a public sentiment favorable to such a system. It will take time and earnest work to create such a sentiment. I sincerely trust the members of this Society, and all citizens who feel an interest in this all-important subject, will do what they can to assist in forming this sentiment.

We have inherited a land rich in natural fertility, with leafy groves, bubbling springs, running brooks and verdant valleys. Let us not be so greedy for the dollars as to rob our fields of their fertility or forests of their trees, and so contribute to the drying up of springs

and brooks, bringing cyclones and blizzards, drouth and cold, and bequeathing to our children a barren, uninhabitable desert. We can leave behind us no nobler monuments than trees and groves. If we multiply these, our lands will be more fertile and fruitful, the winds less harsh, our homes more beautiful, and future generations will arise to call us blessed.

Mr. Brand, the chairman of the committee on pine lands, was requested to present his report.

THE GREAT VALUE OF EVERGREENS FOR WINDBREAKS.

By O. F. Brand, Faribault.

We used to have reasonable winters in this State—winters when there was but little snow, and when the mercury did not go more than twenty-five to twenty-eight degrees below zero, such winters as 1877-8, for instance. Since 1864, I think, we have had three winters that might be called mild, and twenty-four of a different character. Then we can only expect one reasonable winter to seven or eight severe ones. But there has been no winter since 1864 but what stock have needed a good windbreak to shelter them from the cold, cutting winds. If one has a real warm yard into which to turn stock in the winter it will be a saving of the value of at least one-quarter of their feed. This is no exaggeration. That is, if in the ordinary yards and good stables you feed \$400 worth of hay, straw, etc., to your stock, in a yard where wind cannot strike the stock running out in the day time, you would not feed out more than \$300 worth of feed to have your stock in the same condition, and in that way save \$100. There is no reasonable doubt about that. It takes a very large amount of feed to resist cutting cold winds.

What is the best and cheapest windbreak to be had? I answer,

A WINDBREAK OF EVERGREENS,

in my own experience. Four rows of Scotch pine set in 1873 have made a good windbreak for the last nine or ten years, but now they are too open below to keep the snow from blowing through. To protect crops and fields they are fine, still I would prefer one or two row of balsam fir for that purpose in this windy country.

For a belt of evergreens of ten or more rows I very much admire

the white pine. It does not start quite as rapidly in growth as the Scotch pine, but it soon passes it and makes a clean, majestic looking tree. For the windy, western part of the State the white spruce, balsam fir, white pine and red cedar are about all that are desirable.

I have a row of white spruce, natives of the State, transplanted from the forest in 1873, and two years later into the row where they now stand twenty-five to twenty-eight feet high—a dense mass of foliage and limbs from the ground up. A high board fence could hardly do better to keep out wind and snow. This tree does not grow quite as fast as the Norway spruce, but is very much hardier and better for a windbreak over the greatest portion of the State.

For a compact, dense windbreak to surround a building spot or barn and stock yard, there is nothing so good as two rows of our own native white spruce. Set in the row five feet apart and the rows ten feet apart, set so as to break joints. Suppose every farmer in the northwest would take a piece of land eight rods east and west by ten rods north and south and surround it with such a windbreak. If well cared for, in a few years it would be twenty feet high, when with a board fence inside to keep stock away from the trees, would make it so protected inside that, let the tempest howl and wind blow hard as it would outside, cattle and horses would at all times be comfortable so far as windbreaks could make them. Then what an ornament to the farm. No money could buy it from the owner. What a saving in feed. In how much better condition the stock, and if the stock prospers well the owner would.

Now we see in the older parts of the State fine barns with warm basements for the stock through the night. In the morning, frequently about sunrise, the very coldest time in the whole twenty-four hours, they are turned out into a yard protected by a windbreak of barbed wires. Of course where there is room for more than two rows I would advise the planting of more, for I yield the palm to no one as being more enthusiastic than myself on the subject of evergreens and the preservation and restoration of our native pine lands. I would like to see from two to five acres of evergreens around every farmer's home, as I once stated in a previous article on this subject.

BEAUTY AND UTILITY.

If a thing of beauty is a joy forever, and gladdens the heart of its possessor continually, of how much greater worth to the appreciative mind of man must it be, at the same time while imparting perpetual joy to its owner, it likewise contributes directly or indirectly to his

material wants? In the horticulture of Minnesota, where man's most vigilant care and greatest skill is taxed to the utmost to counteract the perpetual war of a remorseless climate, I can conceive of no tree or class of trees so admirably adapted to meet the wants of our horticulturists and farmers as our coniferous trees.

There is a grandeur about an evergreen imparted by no other tree. All people of keen perceptions admire them, whether in clumps or single specimens, planted to adorn the humble cottage of the villager with his one small lot, or the palatial residence and extensive grounds of his more pretentious suburban neighbor, or planted in any shape upon the ample and capacious farms. I repeat, there is a beauty and a grandeur about them which fills the heart of every appreciative person with delight. As windbreaks in this climate they should be regarded as indispensable to the comfort of man and beast; of their benefit to orchards and their influence on fruit trees there can be no doubt, while used as a protection from the severe winds. But it is not only as windbreaks that they are valuable. In this climate remote from water, even though we find hardy varieties of apples which, so far as growth is concerned, seem capable of resisting the extremes of our climate, still they produce but little fruit, owing to the fact that their fruit buds kill or their vitality is so impaired that they produce but little or no fruit.

Evergreens, when planted around and among apple trees, are said by one of our best authorities to continually give off an exodium of warmth and moisture that reaches the distance of its area in height. Such being the fact, if evergreens are planted around and among our fruit trees a double purpose will be filled, and the evergreens, so utilized by the farmer or fruit grower, will thus be made not only a protection but an impartor of life force, whose power will gladden the heart of each and everyone who lives within its influence. Men thrive only on diluted oxygen, purified to a certain extent from the carbonic acid which animals and fires are constantly throwing into it. Collective man enhances the impurity. Is there a remedy? There is, and one entirely under the control of man. It is the absorption of carbon out of the air by increased forest areas, especially of pines, balsam and spruce, red and white cedar. As the commercial world utilizes electricity to do its will, so should the State see that a sufficient number of nature's silent but obedient agents, in the shape of evergreen trees and forests, are raised up to aid in purifying the air and otherwise contribute toward the amelioration of our rigorous climate

Mr. Brand. I received a letter from Mr. Brown, of Lac qui Parle county, containing some items of interest.

FROM LAC QUI PARLE COUNTY.

PROVIDENCE, Jan. 6, 1888.

FRIEND BRAND:—Yours of the twentieth ult. came to hand yesterday. It was marked mis-sent. I will try and answer your several questions. The white pines I got of you are from 8 to 12 feet high. They would have been about 3 feet higher but for being twice injured by hail in June. They are looking very healthy and green. I have about forty white pines. I have not far from 500 Scotch pines; they are looking very fine. Some of them are from 6 to 12 feet in height. They are mostly from 8 inches to three feet tall. I have something over 2,000 white spruce, mostly from 6 inches to 12 feet in height, a few 4 feet, and the one you sent me is 12 feet high and 18 inches in circumference at the ground; it is a beauty. I have about 500 arbor vitæ, nearly all mere seedlings. You will remember that you sent one arbor vitæ tree which was about 4 feet at that time; it is now 10 feet in height. I likewise have fifty balsams, all quite small except one which was planted eight years ago, and was then 18 inches high, and is now about 12 feet high. My evergreens are all looking very green and nice.

I notice A. W. Sias speaks of the Norway spruce as his favorite evergreen. I have had no success with them in this county. Fifteen years ago I planted 300 of them and have not one now. They lived and grew quite well the first season, but nearly all died the first winter. I would take the white spruce first; second, the arbor vitæ; and third, the Scotch pine. These are the most hardy with me of all the evergreens I have planted on my place, and I have seven different kinds. The Scotch pines have made the most rapid growth of any; they have grown from 1 to 2 feet yearly, and sometimes more. I transplanted forty of them last spring which were from 2 to 3 feet high; not one died, and they are looking very healthy now. The white spruce grows more dense in its branches and takes a stronger hold in the earth, and therefore is less liable to get leaned by the strong winds, which makes it preferable for a lone tree. They can be transplanted with as much certainty of living as any of the evergreens. I am now fully satisfied that all may have a fine stand of evergreens about their homes if they will. I see no reason why we may not have evergreen groves, even on these bleak prairies. I am planting them in my grove; they grow well, even where it is quite shaded.

After they have attained sufficient growth I will remove the other trees, when I will have an evergreen forest.

You will see that I expect to live a long time yet. You suggested an article on forestry, but I have not the time now. The snow is so deep and drifted the mail is carried on snow shoes from Canby to Lac qui Parle. It snows most of the time, and the roads are getting worse every day.

Yours truly,

J. H. BROWN.

DISCUSSION.

Mr. Pearce. Mr. President, the growing of timber is a business to which every farmer should give attention. I have been in Minnesota thirty years or over. I have observed that our streams are becoming dryer each year by the process which is going on of cutting away our forest supplies. If this system is continued our winters will become colder and our streams will continue to become less year by year. In fact many of the streams will entirely dry up, and I dare say the Mississippi river will become nearly dry in places, and in time this country will become a cold and barren waste.

Forests should be planted everywhere upon these broad prairies, but I fear, at the rate we are going on, in a short time the country to the west of us will be depopulated, or it will become impossible for the people to make a living. Sir, there must be forests planted; trees must be planted in bodies; a small amount of timber will not answer the purpose. At least one-quarter of the country should be planted in timber.

This work should be carried on under the auspices of the national government. If we are to preserve the fertility of the soil, and make this country habitable, the sooner it is taken hold of by the government the better it will be for all parties concerned.

Last winter I had occasion to go over some of this broad prairie country, and had an opportunity to talk with some of the people who live in those treeless regions, and they wanted to know what should be done. I said "plant evergreens; plant them by the millions!"

I hope this Society will take some action in regard to the forestry question. We ought to urge upon the government to wake up in this matter. There is no good judgment in being quiet on the subject any longer, gentlemen. A thousand years hence and this whole country will be a cold, barren, desert region, if the present condition of things is allowed to prevail.

Mr. Harris. Mr. President, our Society considered this question somewhat last winter and appointed a committee to try and get a bill passed by the legislature to preserve such forests as were still in the possession of the State and that were not valuable enough for agricultural purposes, and to reforest such portions of the State as had been deforested and the land left to revert to the State. Our legislature paid but little attention to the matter, and failed to take any action thereon. There are timber lands in this State that have been cut off and that are growing up to timber, but which lands have been sold for taxes. It is important that this timber which is growing up should be preserved on these lands which revert to the State. If such were the case, large areas in the northern portion of the State would be reforested, and a large revenue might be obtained for the State in years to come.

We need here in Minnesota, in order to make it a perfect garden of Eden, a vast body of water along our northern borders. As we cannot have that the next best thing is to have an abundance of timber, and to reforest this whole western country. If that could be done it would change the climate so that we could raise a great many fruits that we attempt but fail to raise at the present time; it would render the State far better adapted for agriculture of every kind. It is well to agitate this question, and have something definite accomplished.

I tell you, sir, forestry ought to be taken under the wing of the State Horticultural Society. We are recognized as the strongest association in the State of Minnesota in the interest of Agriculture. We, as a society, have labored for the promotion of forestry, and the State Forestry Association should be merged into this Society. I am in favor of keeping up that organization if it could be made efficient, but as it has been managed in the past it would be more successful if merged in this Society. The more organizations we put into one, without interfering with their work, the better.

Prof. Porter said that he had observed, in looking up some matter at the capitol recently that about twenty-two thousand dollars was paid out in a single year for the promotion of forestry, but did not know how the money was appropriated.

President Elliot stated that he presumed the money was paid for bounties for planting trees along streets and highways, etc.

Mr. Gould. Mr. President, I agree with Mr. Brand and Mr. Pearce that the proper thing to discuss now in reference to forestry is the planting of trees on the "western plains" as they used to be called, which embrace Dakota, a portion of Iowa, Nebraska and Kansas.

Now I suppose 'in order to make this matter of planting forests effective, the national government should take hold of it, but the government never will do it unless the effort is first started by societies or individuals. After the experience of the last week or ten days in which scores and hundreds of people who have lost their lives by the storms which have prevailed on these treeless prairies in Dakota and to the west of us, it won't be necessary to cite any evidence that there is abundant necessity for something to be done to protect life and even existence itself in that region of country; and while we have a common interest in the welfare of our kind we should feel special interest for the protection of the people of our own State. It is well known that many of these people are too poor to get away, and will be obliged to remain. A wall of timber should be erected across those plains to stop the sweep of the furious blasts that come down from the north; and from this side of the rocky mountains, and which seem to gather force as they come across the plains and reach the borders of Minnesota, and strike our timber areas and are arrested in their progress. It is here their force and severity is broken up; it is our forests that afford the protection we enjoy. This Society should exert every influence it can bring to bear for the preservation of forests, and if there is anything that can be done to help cover the treeless prairies with shelter belts it ought to be speedily brought about.

It is said there are localities in Dakota where trees won't grow, and in some places trees will not live to be more than three years old. That may be the fact, but I very much doubt it. I would like to see this Society put itself on record in some way in favor of the national government taking some proper action. One suggestion I would make would be to have a competent man in charge of a bureau of forestry, and placing sufficient funds under his control to enable him to do something in this direction.

Mr. Sias. I think a man must be a fool to undertake to live where a tree cannot be made to live. [Laughter.] If there is anything needed to force him to see the necessity or the good sense of doing what Mr. Pearce says, to plant evergreens out there upon the western prairies by the million, why I would just ask those persons to please read over the list and see how many have been frozen to death out there in that country within a few days past.

President Elliot. We have with us to-day Mr. Oliver Gibbs, a former secretary of the Society, who has recently gone to Dakota. I do not know whether he is a delegate from the Dakota Horticultural

Society or not, but at any rate we would be pleased to hear from him in regard to Dakota tree planting.

REMARKS OF MR. GIBBS.

Mr. Gibbs. Mr. President, I have long believed that one of the greatest blunders ever made by the United States government or by the people of the United States, was in parting with the title to prairie lands without first reforesting them and preparing them for the habitation of civilized man. It is not too late to repair the mistake to some extent. Vast bodies of these lands are yet in the hands of the government, and large tracts are also in the hands of the State governments. I believe in reinforcing the theory that is now being advanced at Washington by the forestry bureau of the agricultural department, in taking proper steps looking toward a system of forestry for the lands that are remaining under the control of the government, so that such lands may be preserved as far as possible for this purpose.

Reforestation in Europe has been conducted for many years under government control, and upon scientific and practical principles, and with reference, also, to the uses to which trees are adapted

He said that timber had a marked effect in the amelioration of the climate, but it should be planted extensively to accomplish that result. A good deal had been said in regard to the timber culture act and its repeal. According to his observation in Dakota, he had been led to believe nearly all that had been done thus far in the direction of growing timber had been done under the provisions of that act, and by people who were trying to protect their tree claims, although as a rule the amount of timber grown on these tree claims was limited and did not amount to a great deal. Trees seem to have been planted with little regard to system in the varieties selected, or proper locations.

The greatest drawback in the way of growing forest trees on the prairies was perhaps in the ignorance of the people who planted trees. Those who undertook to grow them were not adapted to the occupation. Many of them had been brought up without the benefit of schools, and knowing little of the principles of forestry or horticulture in any form.

In speaking of the force of the winds on these treeless prairies, he mentioned the fact that in driving across the prairie on one occasion a distance of some ten miles, facing the wind, with his wife at his side, they drove two or three miles debating in their own minds

whether to turn back or go ahead; and coming upon one of these timber claims where there was a fine little grove of trees, the marked amelioration in the atmosphere in the vicinity of the grove could be readily observed, and they renewed their journey, passing along to other similar spots upon the prairie.

As indicating the force of the wind he stated on coming from home, upon the occasion of his recent trip to the city, he started out for the station, skipping over the drifts with a pair of ponies, about the only conveyance in which he could get across the country, and coming along he saw a black object sticking above a huge drift of snow, and as he came nearer saw it was the end of a stovepipe; and on driving up found a tunnel some three feet square which extended thirty or forty feet under the drift, and was the means of access for the man and his family to and from his dwelling. He saw no smoke coming from the stove-pipe, but concluded there was a family in there, and probably all comfortable and warm, although he did not go inside.

But in Dakota they were becoming awakened as horticulturists and foresters on this subject, and there was no doubt the legislature would take some proper action in the direction of reforesting the prairies. Gov. Church was a very earnest forester.

He would recommend memorializing Congress in regard to taking prompt and decisive action to advance the interests of forestry in the Northwest.

Mr. Underwood said he had had some fifteen years experience on the prairies of Illinois, and more recently personal supervision of timber claims on the prairies of Dakota, and felt like saying a good word for the provisions of the timber culture law. His friend, Mr. Gibbs, did not seem to think very much of these timber claims.

Mr. Gibbs. I do not think they have much effect so far as climatic influences are concerned. It is true they are a good thing for the settler and his neighbors.

Mr. Underwood said he had traveled through Southern Minnesota quite thoroughly while canvassing for the sale of trees some nineteen years ago in the part of the country where there was very little timber. In passing through the same country some fifteen years later he had been greatly surprised at finding the change that had been wrought in the appearance of the country during that time. He could hardly recognize the country, although he had a good memory of places. A large amount of timber had been planted out and was being successfully grown. He had never been entirely foiled in his endeavors to grow trees on tree claims in Dakota, although they had no

moisture there to speak of for two or three years at a time. In the spring of the year he had found very little moisture, and one could hardly dig a post-hole. He had been overseeing quite a number of tree-claims, taking care of some seventy acres of trees, growing them for different parties under contract. He thought the timber culture act a beneficial one and ought to be upheld.

Mr. Pearce inquired what per cent of timber claims were successfully maintained.

Mr. Underwood said about one-third or one-fourth of them were first-class. He referred more particularly, however, to his own experience, and could not say what per cent of timber claims in general were successful.

Mr. Fuller said that one of the land officers at Benson had made the statement that he knew of but two men in his district who were complying with the timber culture law strictly and were making a success in growing trees. That statement was made some six or seven years ago.

[The Commissioner of the General Land Office estimates the proportion of timber culture entries made without securing the results intended by the provisions of that act at 90 per cent.—Sno.]

Mr. Gibbs said the best estimate he had seen of the percentage of lands that had been covered with forests under the provisions of the timber culture act was about 30 per cent in Dakota and Minnesota. Under that act only one tree-claim could be taken in a single section, and only ten acres of trees were required. That was a very small amount of timber for an entire section, and so far as climatic influences were concerned the operation of the tree claim law would be an utter failure. So far as accomplishing anything for forestry in general it would amount to very little. If we wish to reforest this country for the purpose of affecting changes in the climate we must have the machinery of the government set to work, in the manner it is conducted in Europe. He thought there was no better purpose to which the idle millions now lying idle in the government treasury could be devoted than to the reforestation of the treeless prairies in the hands of the government.

Prof. Porter said if any action was to be taken in regard to this matter of sustaining the timber culture act no time should be lost. Bills had already been introduced in Congress for the repeal of the law, and also for the repeal of the pre-emption act.

Six years ago he had gone on a tour of exploration in Minnesota and Dakota, and was convinced at that time the timber culture act.

was a failure; but since that his opinion had been entirely changed. In visiting some of the same localities recently, he had been surprised to find beautiful, thrifty plantations of timber growing. He mentioned one instance in particular, on the Grandin farm, in Traill county, Dakota, where some seventy acres had been planted in trees some twelve or fifteen years ago. The trees were as handsome as any he had ever seen grown. It was necessary that trees should be properly set out and intelligently cultivated and cared for. The trees referred to stood from thirty to forty feet high, were beautiful specimens and almost every tree was living.

One of the greatest drawbacks for success in growing trees upon the prairies was the ignorance of the classes who were trying to grow, them. Many of these settlers were from other professions than that of farming, such as hod-carriers, hack drivers, etc. Many of those attempting to open up farms in that new country were middle-aged men, who had made failures in their calling elsewhere. They had followed a little of everything except practical farming. When they emigrated to Dakota for the purpose of acquiring a home, they found themselves totally unprepared, so far as experience was concerned, for agriculturists or horticulturists; they were as ignorant as to farming operations practically as a child ten years old was ordinarily, and had to learn by actual experience. On planting out their trees upon their new breaking, because they didn't grow timber large enough for fuel in three years, they pronounced the whole thing a failure. The result was, where there was one such person made a success there were a thousand to make a failure; not because the soil would not grow trees, but people there did not understand how to grow them, or failed to give them proper attention.

Mr. Pearce said the difficulty with many people in that country was they were unable to obtain trees. Many of them lived at a distance from railways, and did not know of reliable parties of whom they could obtain trees and cuttings. If trees could be furnished in large quantities to those who would set them out they might be grown successfully. Scotch pine would grow rapidly, and could be furnished at reasonable rates. Thousands of dollars were paid for trees that were of no value. Another thing, trees were too much scattered and set too far apart. They were neglected and the fire allowed to run through them. Many valuable timber claims were ruined after the trees had attained considerable size.

Prof. Schotzka said that according to his experience it would not do to depend upon farmers to extend timber culture; forestry ought

to be under the management of the general government. In Germany forests were maintained at government expense, which had control, also, of private forests. While conditions were different there from those of America, it showed very plainly that some similar system should be pursued. Ten acres of timber for a quarter section of land was insufficient. As a rule, one-fourth of the area of the country should be covered with forests in order that agriculture might be carried on successfully. Some definite system should be pursued having reference to varieties grown, character of soil, etc. Farmers as a rule are making poor selections, planting such trees as cottonwood, white willow, and other inferior varieties. Those were better than none to start with on the prairies, till such time as more valuable timber could be grown.

President Elliot stated that Prof. Schotzka had recently issued a valuable little work on the subject of forestry, which he advised those interested in this subject to procure.

Secretary Hillman stated there had been a mistake on his part with regard to the transportation of delegates to and from the meeting, and in justice to the St. Paul, Minneapolis & Manitoba Railway company, he desired to read the following letters:

LETTER FROM MR. WARREN.

ST. PAUL, MINNEAPOLIS & MANITOBA RAILWAY CO.,
ST. PAUL, MINN., Jan. 6, 1888.

S. D. Hillman, Secy., Etc.

DEAR SIR:—I am advised concerning the State Horticultural Society which meets at Minneapolis, Jan. 17th to 20th.

As no application has been made for reduced rates for this occasion via the St. Paul, Minneapolis & Manitoba Railway, I will be obliged if you will inform me if such will be desired.

Yours truly,

C. H. WARREN,
Genl. Passenger Agent.

On replying to the above stating that reduced rates were desired, the following was received:

ST. PAUL, MINNEAPOLIS & MANITOBA RAILWAY CO.,
ST. PAUL, MINN., Jan. 10, 1888.

S. D. Hillman, Secy., Etc.

DEAR SIR:—I am favored with yours of the ninth. In reply would

say that I have with pleasure instructed our agent at Minneapolis depot to return delegates from the Horticultural Society meeting Jan. 17th and 21st at one-fifth fare, under the certificate system as described in our circular 95, copy of which will be found herewith.

When writing you previously I supposed the reason you had not made application to us for these reduced rates was that you presumed the arrangement was provided for by your agreement with the St. Paul Association. I regret that such was the case, and think that probably this supposition accounts for the fact that no mention is made in your circular of the St. Paul, Minneapolis & Manitoba Railway as being one of those lines which offer reduced rates for the occasion in question.

I now desire to state that we are always glad to offer the benefit of reduced rates to such societies as yours, and I would be glad if these sentiments could be made known to the members of your association

Yours truly,

C. H. WARREN,
General Passenger Agent,

On motion of Mr. Harris a vote of thanks was tendered the agent of the railway company for the courtesy shown the Society in offering reduced rates of fare.

On motion the meeting adjourned till 7 o'clock P. M.

EVENING SESSION.

WEDNESDAY, JAN. 18, 1888.

The meeting was called to order by President Elliot.

The following telegram from Gov. McGill was read:

ST. PAUL, Jan. 18, 1888.

Wyman Elliot, State Horticultural Society:

Owing to public business which has come up to-day, it is doubtful about my being able to go to Minneapolis this evening; will try and be with you before your session ends.

A. R. MCGILL.

Later the following letter was read, explaining further as to his absence:

EXECUTIVE DEPARTMENT, ST. PAUL, MINN.

Hon. Wyman Elliot, Minneapolis :

DEAR SIR: I made all my plans to go to Minneapolis this afternoon, but have been detained on a requisition case and cannot leave. And thus it goes.

Respectfully yours,

A. R. MCGILL.

Jan. 19, 1888.

The following paper was read by Mr. Cleveland:

STREET AND LAWN PLANTING WITH TREES AND SHRUBS.

By H. W. S. Cleveland, Minneapolis.

Nothing connected with the practice of my profession as a landscapegardener has impressed me so deeply and painfully since coming to Minnesota as the vast amount of wretched work in tree planting from which no satisfactory result can ever be hoped, and the whole cost of which is literally thrown away. The explanation is not difficult. It results primarily from ignorance and false economy, and secondarily from the unscrupulous greed of a class of men who have no reputation to sustain, and are ready to impose upon the parsimonious by doing poor work at a low price, or to swindle those who are willing to pay a good price, by furnishing worthless stock.

The rapid growth of new cities and towns creates everywhere more or less of the fever of speculation in land. The rivalry of real estate dealers incites them to seek to render their suburban additions attractive to customers by adorning them with foliage, and applying the principles which govern the ordinary transactions of commerce, they seek to accomplish the object by a wholesale contract to furnish and plant the trees.

The real estate men are not as a class familiar with trees or their culture. Many of them do not know one variety from another, or at least as one of them frankly said to me, "I know an elm when I see it, and I call all other trees maples."

It is not to be supposed that such men can have any realizing conception of the careful management required in transplanting and subsequent nursing of trees in order to secure the vigorous, healthy

growth which is essential to beauty. Their only object is to sell their lots, and they think the chance of doing so will be increased if the new streets of the subdivision are planted beforehand. They do not expect and rarely find that a purchaser is more critical than themselves, and when the lots are once disposed of they have no farther thought on the subject.

This large demand springs up in every new and growing town and is answered by a class of men, many of whom are as ignorant as their customers, of the nature and requirements of a living plant and think it may be handled with as little care as so much lumber. Their rivalry leads them to under bid each other, and the purchaser closes a contract for the delivery and planting of thousands of trees, at prices that would be ruinous to the contractor if anything approaching the needful care, were bestowed upon the selection, lifting, planting and subsequent nursing of every one of these baby vegetables. The trees are got from the woods or the refuse of nurseries, are torn out of the ground without the least regard to the preservation of their roots, the tops are lopped off, and they are often exposed to sun and air for many hours before being stuck into holes in the ground and left to shift for themselves. The result is that the real estate dealer the next season calls the attention of the would be purchaser of a lot, to the long rows of poles which line the streets, having a few leaves at the top, which in due time are expected to expand into such luxuriant foliage as to over-arch the street, but in reality either perish before the season is over or drag out a miserable existence as unsightly cumberers of the ground. The blame for such a state of things is not to be laid solely at the door of the tree dealers. Its primary cause lies in the all pervading passion for low priced goods of all kinds.—forgetful of the fact that it is fatal to all true economy. Its prevalence is one of the worst evils which taint our social system, and is so much a matter of habit that it betrays itself in absurd inconsistencies,—as for instance the philanthropist who bewails the fate of the half starved sewing girls, but seeks the cheapest clothing store when he has to buy a coat.

There is as much difference in trees as in horses; they show quite as plainly the evidence of good grooming, and I may add that there is quite as much jockeying in the trades.

What should we think of a man who bought horses by the thousand on contract, "warranted for one year?" Should we give him anything but derision if he complained that he had got only a lot of raw-boned, spavined creatures that had never known the luxury of a

curry comb? The horse is a beautiful animal, and a tree is a beautiful object, but it is hardly safe to say that one horse or one tree is as good as another, though practically this is what such dealing amounts to.

MINNEAPOLIS METHODS.

As a contrast to this, and as an example what good work may accomplish, I may point to the trees in our parks, which have been planted and cared for by the superintendent, Mr. Berry, a man with whose success as a tree planter I had been for many years familiar in Chicago that I felt as if I had secured a prize for Minneapolis when I found that his services were to be had, and introduced him to the park commissioners.

Not three per cent of the trees he has planted have failed to live and make such healthy and vigorous growth that already, in two years' time, the groups in the parks are crowding each other, and we are thinning them by removing individual trees to other points, each group serving as a nursery to furnish a supply for further planting, while those on the street,—as witness the Hennepin avenue boulevard,—already furnish extended lines of luxuriant foliage. But no cheap, inefficient work could secure such results. These trees were procured from a responsible nurseryman, who cares for his trees as he would for living animals. They were packed and transported with careful provision for guarding the roots from exposure to sun and wind. They were planted in excavations large enough to admit a liberal supply of rich earth, in which every root was carefully spread out by hand, with fine mould worked in among their tender fibres; they were well watered and thoroughly mulched, and all through the first and second season after planting they have been liberally supplied with water,—not in dribblets of a pailful each, but with thorough drenchings from a watering cart at intervals sufficiently frequent to prevent their suffering from drouth. The life of a tree is measured by centuries. It is in swaddling clothes at the age of five or ten years, and must be nursed with the tenderness which all babies require.

Anyone who expects satisfactory growth with less careful attending than this will be disappointed. A tree is a vegetable production with no more power to take care of itself than a cabbage. What should we think of a farmer who planted and cultivated his crops in the slovenly way that trees are often treated? Would he not deserve the

penalty he would surely suffer of having only a miserable crop of unsaleable runts? And yet there are plenty of men who are ready to furnish and warrant the growth of trees on terms which render proper care an impossibility, and the reason that such men exist is due to the persistence of purchasers in trying to get good work for poor pay. And as I said before, it is this spirit which casts a blight upon everything we attempt. There is not a branch of art, literature or manufactures that is not tainted with the shams which so many of us are willing to tolerate rather than pay the worth of a sterling article.

As long as there are purchasers animated by such a spirit, there will be sellers ready to supply them, but it is surely a primary duty of such associations as this to warn all who have any hope of satisfactory results to beware of cheap tree venders, and proclaim far and wide the fact that fine trees are an impossibility without expenditure of time and labor, which must either be performed in person or paid for in money. It is simply throwing money away to attempt to do such work cheaply, and thousands upon thousands of dollars are annually expended in the effort.

SELECTING STOCK.

Yet I am well aware that there is another side to the question, and that the evil is not confined to those who expect good results from parsimonious expenditure. Unscrupulous dealers will be as ready to cheat by demanding high prices and claiming a superior quality of goods, as by under-bidding, if they meet with a customer who is more likely to be caught by such a plea. The only safe course is to deal directly with men of established reputation, which they cannot afford to jeopardize by false dealing. A man whose life is devoted to the rearing of trees for sale, who has a large and costly nursery in which the business is systematically conducted of growing the trees from seed, and planting them in nursery rows, transplanting them from time to time as they require wider space, and securing by that means an abundant growth of fibrous roots immediately about the stem, so that they may be removed without injury — a man, in short, who devotes his life to the business, and is dependent for his success upon the reputation he acquires for furnishing good stock, is of necessity a responsible party, with whom it is safe to deal, and from whom it is safe to expect reasonable satisfaction in case of accident.

Such men and such nurseries are easy to find, and if men who appreciate the value of good stock will apply directly to them they can get what they want, and then, if they will pay competent workmen for

planting them and caring for them properly, they may look for satisfactory results; but not otherwise.

In order to secure success in planting it is necessary to know the habits and requirements of the variety selected, and be sure that the conditions of soil and position are adapted to its wants. A tree taken from the woods is sure to suffer from being transplanted to a position where it is fully exposed to the influence of the sun and wind.

Some trees thrive best in rich, deep, loamy and even very moist soil, —others require perfect drainage, and some thrive best even in a sandy soil, and success in planting depends very largely upon the careful observance of these natural wants.

Now I have known here in Minneapolis, of trees furnished by contract for street planting on these arid plains, to be taken from the rich alluvial soil of low lands where they were growing thickly together, and where, having never been transplanted, they had only long spreading roots which were roughly cut off with a spade at four or five inches from the trunk, and then jammed into holes barely large enough to contain them, and the sand which had been taken from the hole shoveled back and tramped around them, and the trees expected to live.

I take it for granted that the audience whom I have the honor of addressing here, is largely composed of men who appreciate the truth of these statements and require no argument for their enforcement.

The question of reform is one that commends itself to your consideration, and is one that I confess my inability to solve. It would seem that the first step would be to enlighten those who are interested and enlist popular feeling in a cause which so nearly concerns our daily and hourly comfort as the beauty of our streets and graceful, homelike aspect of our dwellings and their surroundings. But I have been assured that an audience could not be got together to listen to a lecture on such a subject, while there is no hall large enough to hold the crowds that will gather to see two brutes pummel each other in the prize ring.

What twaddle it seems, to talk of a love of the beauty of nature, and a prevailing rural taste in the face of such facts! I feel this evening that I have listeners who are actively interested in the subject, — but outside of those who are in some way connected with the business there is lamentable deficiency.

VARIETIES.

My experience in Minnesota has been too short to enable me to speak

with authority concerning many of our native trees as regards their adaptation to this locality, but of some I feel no hesitation in report-unqualifiedly in their favor.

There can be no doubt about the elm, the linden, the white ash, the hackberry or the box elder, all valuable trees and well adapted to street planting. I should also place the sugar maple in the front rank, but I hear on all sides complaints of its slow growth, in reply to which I can point to an avenue of sugar maples now averaging two feet through and furnishing a continuous shade, which I planted after I was thirty years old, on the day of President Polk's inauguration, at what was then my home on the Delaware river, and I am still planting trees and urging others to go and do likewise.

My friend, Mr. C. M. Loring, president of our park commission, and one, as you all know, whose taste and knowledge give great weight to his opinion, is a great advocate of the silver, or soft maple, which indeed is a beautiful tree when in perfection, but its liability to be attacked by insects and to be broken by storms, are to my mind insuperable objections. The birches are certainly among the finest of our ornamental trees, and I wonder that they are not in more frequent use. The yellow birch and the canoe birch are superb trees, and the cut-leaved weeping birch has, I think, no rival in its peculiar style of delicate grace and beauty.

I am very confident that the *catalpa speciosa* will prove hardy here, and I have my belief on the fact that not one of a great number planted three years ago on our Central Park, showed the least sign of injury from the extraordinarily severe weather of last winter. Its rapid growth and the great durability of its timber make it exceedingly desirable for extensive planting. I have here some samples in evidence, which you may be interested to examine. They were sent me by Mr. E. E. Barney, the well known manufacturer of cars at Dayton, Ohio, who uses the timber very extensively in his business, and urged its extensive cultivation. You will see by these samples that it is a beautiful wood, susceptible of a fine polish, and the fact that one of these pieces is from a post that had been in the ground forty-seven years, and another seventy, shows that it is practically indestructible. Unfortunately, the wood is not hard enough to resist the wear and tear of railroad travel, and refuses to hold the spikes when used for railroad ties.

NATIVE OR FOREIGN TREES.

The general statement may be advanced with certainty that our

own native trees are better adapted to our wants than any imported ones, and will be found in the end to give much more satisfactory results; and when, in addition, we reflect that we have more than twice as many species as are found on the continent of Europe, while many of them excel in grace and dignity, and in beauty of autumnal foliage are beyond all comparison with the forests of Europe, it would seem a waste of words to urge upon tree planters to look no further than our own resources for supplying their wants. But the great difficulty lies in the scarcity of such material in our nurseries, which, with the exception of a few native varieties which are well known and in constant demand, like the elm, ash and maple, are stocked almost wholly with foreign trees and shrubs, often inferior in beauty, and always found to be less durable than native stock which may be close at hand and eagerly sought by foreign tree growers.

European trees, after fifty years trial, and in repeated instances with great promise for a long time of highly satisfactory results, have almost without exception proved inferior in beauty and durability to our native stock.

No foreign evergreen can compare in majesty and beauty with our white pine, our hemlock or our white spruce. The same comparison may be made between the English elm, the European linden, ash and maples, and ours.

The European oaks are altogether inferior to ours in number as well as character, and yet we may see how little we appreciate the treasures of our native forests, in the contempt with which we regard the overcup oak, one of the most picturesque of the species, which is highly prized by foreign cultivators, but ruthlessly destroyed with us with the contemptuous remark that "its nothing but a burr oak, and isn't worth saving."

The Norway maple, the European larch and the French white willow, are importations which have proved well worthy of extensive adoption and culture in this country.

The Japanese gingko tree has proved so valuable an addition to the list of ornamental trees at the East, that it is well worthy of thorough trial here, and it is probable that many very valuable acquisitions may be made from Japan, China and Eastern Siberia, the climate and aspect of which regions correspond more nearly with our own than any portion of Western Europe.

ORNAMENTAL SHRUBBERY.

It is not as generally known as it should be that the seeds of trees and

shrubs carry with them and perpetuate, not alone the characteristics, but the constitutional strength or weakness of their parents. Thus trees of every variety grown from seed brought from California, are too delicate to bear the climate of the Eastern states in the same parallel of latitude, while the seeds of the same varieties grown on the eastern slope of the Rocky Mountains produce trees which are perfectly hardy.

In order to a proper knowledge, therefore, of what to plant, it is essential to know not alone the limits to which the general distribution of its species is confined, but the exact physical conditions of the particular locality from which the individual tree or seed was brought, and it is largely owing to the utter neglect of this necessity that so small a proportion of the trees that are planted ever attain such a degree of luxuriance and beauty as to excite admiration, or even attract especial notice.

In regard to shrubs for ornamental planting, I should feel that it was presumptuous in so new a comer to Minnesota as I am to offer advice as to selection of foreign varieties best adapted to the soil and climate, but I feel no hesitation in urging the liberal use of the rich store of native shrubbery with which the woods and swamps are filled.

I have wished ever since I have been here that I were so situated that I could make a collection merely for my own gratification of the beautiful wild shrubs of Minnesota, many of which I never saw till I came here. They could be easily grown from seed, and any nurseryman might supply himself, and render a more valuable service by introducing them to purchasers, than by confining himself to the lists which are sent to him from abroad.

I am very glad to learn from Prof. E. D. Porter, superintendent of the agricultural college of the University of Minnesota, that this subject has already engaged his attention, and he has begun the collection of native trees with a view of making an arboretum in which all the trees, shrubs and flowers of this region may be represented. The grounds of the experimental farm certainly offer the most appropriate place for such a collection, and it will form one of the most instructive and interesting features of the institution.

Mr. Berry has drawn liberally from these native sources for planting on our parks, and many of the most attractive groupes of shrubbery are composed entirely of shrubs transplanted from the woods in the immediate vicinity of this city. That which covers the little island in central park and the adjacent shores on each side the bridge

is almost wholly of this description, and no portion of the park has been more admired for its picturesque natural effect than this.

The use of shrubbery for ornamental effect, it appears to me, is not appreciated as it deserves to be, largely owing no doubt to general ignorance of how to make judicious use of it, which cannot be taught in books, and which few of our people will take the trouble to learn by practice.

EMBELLISH THE LANDSCAPE.

One of the most important and desirable objects in the arrangement of grounds, whether public or private, is to secure variety. If on entering a park, or a private estate, you find that you can take in the whole area at a glance—or see all the arrangements from any one spot, you cannot profitably derive the pleasure and interest from their inspection that you would have if they were revealed to you in succession so that each would be a new surprise.

Suppose for instance on entering the grounds of a villa residence of a few acres you find a level area of perhaps an acre between the house and the highway, and the rest of the ground sloping down to the bank of a stream,—beyond which you have a distant view of the city, or of a wide expanse of beautiful country. The whole area, if left open, can be seen at once on entering the place from the highway, and most proprietors would have the feeling that it was on all accounts desirable to impress every visitor with a just conception of the attractions he had secured from the outset, and would perhaps arrange the driveway to the house so as to afford the best possible view of the distant prospect, which would absorb his attention at once.

But now suppose, instead of this, that the entrance drive is so arranged, and groups of trees and shrubbery so planted, that until the visitor reaches the house he would see only the area in front of it, which might be so arranged with lawn and flowers and trees as to have a pleasant, homelike aspect.

He enters the house, and passing into the parlor the whole of the distant view bursts upon him as a surprise as he looks from the windows. The same thing can be repeated in detail in the various subdivisions of the grounds, so that a walk through them will afford a series of surprises, and convey the idea of a much more extensive tract than they really comprise. Now, a chief object in the planting of shrubbery is to aid in securing this effect of subdivision, and if properly done it serves the purpose so completely that paths or other objects may be effectually screened though only a few feet distant.

Very few people, however, ever think of such an object in planting. They buy flowering shrubs with which they are acquainted or which have been recommended to them, and plant them wherever they think each individual will show to the best advantage, and without a thought of the possible effects which might be secured by the tasteful use of groups and masses. The true art lies in economizing the sources of pleasant interest so as to make the most of each, and the value of shrubbery as a means of securing that object in the most natural and graceful manner is apparently little appreciated.

The landscape gardener is rarely able to direct in person the execution of his plans, and the result as carried out by others, whose ignorance or conceit often leads to the introduction of their own ideas, is generally widely different from his original conception.

The chief hope of improvement lies in the action of such associations as the State Horticultural Society in disseminating information and encouraging the taste for rural pursuits, the love of nature and the tasteful development of the resources with which we are so richly endowed. The presence of such an assembly as I have the honor to address this evening affords the best guarantee of increasing interest in the subject, and I beg leave in conclusion to thank you for the kind attention you have given me.

At the conclusion of the reading of the paper, on motion of Mr. Harris, Mr. Cleveland was given a vote of thanks, and made an honorary life member of the Society.

President Elliot stated that Mr. Cleveland was one of the first members to join the American Pomological Society, having attended its first meeting.

Prof. Folwell, of the State University, was then introduced and delivered a very interesting and able address.

THE DISPOSAL OF CITY CLEANINGS.

By William W. Folwell, LL. D., Professor of Political Science in the University of Minnesota.

Civilized man is the only animal which willingly lives in its own filth, while claiming to be the only animal intelligent enough to know the consequences.

The brutes are generally cleanly; and human savages, being wanderers, have the advantage over civilized man that they can easily run away from habitats which have become unendurable.

The civilized man deliberately and knowingly sits down and dwells amid the accumulating offal, trash and excreta of generations.

On the site of old Troy three successive cities have been built on as many layers of made soil. The Roman forum, lately uncovered, has been lying for centuries under fifteen feet of material, mostly decomposed deposits of a cattle market.

Millions of our species have gone into premature graves by the way of black death, plague, Asiatic cholera, typhoid fever, diphtheria and other filth diseases, and to-day in our modern cities and towns thousands are going the same way.

The economic efficiency of vast numbers is reduced by an incalculable amount, and the expense of maintaining invalids is another vast increment of loss.

The mediæval way of accounting for all this death and loss was to attribute them to the Divine vengeance, punishing men for sin. And this was merely a theological expression of a fact not now disputable, that disease and premature death are inevitable consequences of filthy living.

Fortunately sunshine, fresh and unlimited air, and rain water are friendly and protective. Fortunately, also, men are so scattered over the surface of the planet that these protective agencies, co-operating with the natural disinfecting qualities of soil, can dissipate and disarm the diabolical forces of disease.

But this scattering of population is less thorough than it was a few generations ago. City life is always fascinating. Co-operation in comforts and pleasures is easy in towns. Men are gregarious, and enjoy keenly the nervous sympathy and stimulus of crowds.

There is no longer any recollection, there is no actual tradition of great city plagues. That last survival of the feudal institution, the country gentleman, has moved into town. The roadside smith, tailor, weaver, shoemaker and their fellow artisans have been swallowed up by the great factories which environ our town and cities.

It seems useless to lament this inevitable tendency.

The first census of the United States in 1790 showed three and three-tenths per cent of the people to be in the cities. In 1830 that percentage had doubled, in 1850 quadrupled; and in 1880 our cities held twenty-two and one-half per cent of the population.

In England sixty per cent of the people were in 1881, in cities. Our own country will soon see one-half of its population collected in cities.

The most vexatious problems of politics, economics and morals of

the age are city problems. Democracy has failed in many of our large cities and the people are calling wildly on State legislatures for protection. In this very town (Minneapolis) citizens have been publicly asked to contribute to the support of a soldiery, liable to be useful in putting down the "dangerous classes."

Passing without mention a large group of city problems I come at once to the sanitary problem. As life and health are more precious than all other things, the sanitary interests of cities outweigh all other interests. And still I think it can be shown that in the long run the economic interests of a city are best subserved by effective sanitation at almost any cost. If citizens mean to live and live well they must provide for these fundamental things:

1. A well drained and uncontaminated terrain for their city.
2. An abundant supply of pure water.
3. The uninterrupted access of fresh air to all passages and enclosures.
4. The removal and purification of filth and rubbish of every kind.

If cities were built ideally according to plans and specifications, these fundamental things would be attended to first of all. As a matter of fact they are tardily undertaken when the increase of disease and death frightens the powers that be, into action. And it rarely happens in this land of local administration, that any orderly plan is made or followed.

It is of one of these four fundamental things, the removal of city rubbish and filth, that I am, by the kind invitation of your president, permitted to speak at this time. If the subject should prove uninteresting I throw the responsibility on his broad shoulders, well able to bear it.

Next to the people who create the filth of the cities, the market gardeners, fruit farmers and dairymen who environ modern cities, are most interested in its proper disposal. In an ideal state of cultivation every particle of decomposed animal and vegetable matter goes back to the soil whence it came. The waste and offal which are now filling and polluting our streams, lakes and bays and destroying their fish, will some day cover places now desolate with blooming gardens and fruit-laden orchards.

It seems to me that without delay a goodly portion of the city filth should be put to its proper use of fertilization in the neighborhood of cities. I should be glad if this paper would set a single person to work on this problem. I hope it may set more than one to thinking.

Some account of various plans for disposing of city offal may prove interesting and furnish suggestions for further efforts.

The matter to be disposed of is conveniently separated into four parts:

1. Solid matter, not excreta, including sweepings, ashes, garbage and litter.
2. Excreta, i. e. fæces and urine.
3. Foul waste, including house slops, and the waste of factories of many kinds.
4. Surface water.

Let us eliminate the first and last elements.

Of the first, solid matter, not excreta, the only thing to do is to collect and cart it off to some suitable place. As to its ultimate disposition I will speak farther on.

Of the last constituent, surface water, it needs only to be said, that it must be allowed to run off in drains, closed or open. Of late years there has been a very lively debate between advocates of two systems for disposing of surface water. One party clamors for a so-called "separate system" of drains, independent of the sewers. The other party prefer to turn all rain water into the ordinary sewers, enlarging their capacity accordingly. The "separate system" has obtained considerable acceptance in London.

For our purpose we need to remark that any attempt to utilize water-carried sewage is immensely increased in difficulty if it is diluted with surface water. It is, I think, probable that the separate system may come into extensive use on this account, but there are those who question this.

There remain for further consideration the other two constituents:

Excreta and

Foul water.

Before the introduction into England toward the close of the sixteenth century of the ancient Asiatic water closet, it was the custom to remove excreta in wheeled boxes or tubs, and allow foul water to run off in open drains. The formation of sewers was an afterthought. The great Cloacæ of the Romans, the huge original conduit of Paris, the first sewers of London, were constructed to drain off superfluous ground waters, those in particular of certain streams and swamps.

When the slop waters of a city became voluminous and their discharge in open drains intolerable it was a simple device to put them out of sight by turning them into the great underground drains. A rapid extension of lateral and tributary sewers was a natural consequence. The introduction of water supply systems into modern cities has brought the water closet into extensive use, and along with it the so-called

"water-carriage system" of removing excreta. This consists in simply turning all faecal matter at once into the common sewer to float off to the point of discharge. The water-carriage system is so cheap, convenient and effective that it is not likely to be supplanted in our time.

There is but one competing system, the so-called (from its inventor) Liernur system in the city of Amsterdam, Holland. That city cannot discharge its sewage into the sea because it lies too low in the water. By means of powerful air pumps, operated by steam power, the sewage is sucked through iron pipes to a central receiver. There the water is expressed, the solid residuum dried and converted into a valuable manure. The system is reported to be effective, very favorable to good sanitation, but not economically cheap.

Modern sewage is composed, then, of excreta and foul water, with or without rain water. A previous generation thought to have disposed of sewage by turning it into underground drains and shutting it out of sight. All it had accomplished was the partial removal of a nuisance from door yards and kitchens to the mouth of the sewer. I say partial, for the sewer itself now became the nest and brooding place of deadly gases, which no Yankee ingenuity in traps and seals has ever completely shut out of houses. The royal blood of England was poisoned almost to death but a few years since by sewer gas emptied into a palace through the most scientific appliances.

And the question is before us this hour: How shall we dispose of our sewage so that it shall not dispose of us?

English experience here furnishes the most valuable suggestions. The immense increase of manufacturing establishments, such as woolen mills, paper mills, dyeing and printing works, bleacheries, gas works, etc., so polluted the rivers of England that parliament intervened in the famous Rivers Pollution act of 1867. The operation of this act led to numerous experiments for purifying sewage.

Besides this there was, as there had been for centuries, the sewage problem of London. In former times the slops of London went into the Thames as that stream flowed through the town. Then the outlets of the sewers were carried down stream, and then still further down. A half million tons of solid matter turned into that river yearly have threatened to ruin navigation, have destroyed the fisheries and created a nuisance beyond the power of words to describe.

Without going into details, we may group the English experiments under three heads. Of course I do not count the ancient no-system of simply letting sewage flow where gravitation and tide would let it flow.

1. SIMPLE SUBSIDENCE.

This plan is that of emptying the liquid sewage into large tanks or vats, in which the solid matter settles and the liquid overflow passes into the nearest stream or tidewater.

Such is the condition of some English rivers that this effluent water, although loaded with deadly organic poison, is actually purer than the stream into which it may issue. This was the case at Leeds where a costlier plan of sewage disposal was abandoned because it turned out the waste water cleaner than the river.

Under this system the solid matter called the "sludge," is carted or barged off to some place of deposit on land or water. This plan may serve well as a temporary one for small cities.

2. IRRIGATION.

As the word indicates, this system disposes of sewage by discharging it by means of suitable piping over areas of agricultural lands, being itself purified while enriching the soil. The plan is not new.

The town of Bunzlow, in Germany, has had a sewage farm in operation for three hundred years.

The Craigentenny meadows, near Edinburgh, of four hundred acres, have received a good share of the sewage of that city for a hundred years, and that to great profit.

A number of English towns, among them Croydon, Cheltenham and Blackburn have adopted the irrigation system.

The city of Berlin, built on a sandy plain, has of late years introduced this plan on a great scale. Still later Paris has begun disposing of a portion of her sewage on land lying west of the Seine.

A drawback to this plan is that lands do not always need irrigation, while sewage flows incessantly. If no other remedy is devised the surplus must flow off by some waterway. The experience of Berlin and other North German cities shows that the cold of northern winters does not preclude the discharge of sewage upon land.

In mild climates and in the warm season anywhere, a modified form of the irrigation system promises to serve as a useful adjunct for disposing of sewage when not needed for irrigating. This modification consists in flowing the sewage off the fields on to small areas of land thoroughly underdrained to a depth of six feet or more. The soil to the depth of the drainage becomes a great filterbed, holding solid and suspended matter, leaving the filtered water to escape by the drains.

By alternating the flow between several plats, and thus leaving them to the operation of sun and air at intervals, it has been found practicable to discharge the sewage of 1,000 people on each acre of porous soil. Irrigation—"broad irrigation" as we may now call it—requires an acre to each 100 people. The Royal Commission of England in 1832-84 recommended the "intermittent filtration plan" for London.

3 PRECIPITATION.

There are many contrivances under this head all having for their object the acceleration of subsidence of suspended matters. When quantities become large, subsidence is slow, and decomposition sets in. To quicken subsidence various chemical substances are mingled with the sewage in the settling tanks. Lime in the shape of milk of lime at the rate of one ton of lime to one million gallons of sewage has come into commonest use. Other chemicals employed are tar and chloride of magnesium or of lime, sulphate of alumina, protosulphate of iron, and a mixture of clay (alumina), blood and carbon. The system employing alumina, blood and carbon is called for shortness the A, B, C process.

After precipitation by whatever process, the effluent water still holding organic matter in solution may be variously disposed of. It may be discharged into the sea or a stream. It may be used for irrigation or filtered through soil. The city of Birmingham, of 600,000 people, precipitates by the milk of lime process, and irrigates 1,200 acres of land with the waste water.

The disposal of the sludge still remains. It is of little value for manure, and has a gelatinous consistency which makes it very difficult to handle. On the seaboard it can be pumped into barges and carried out to sea. I meet nowhere with any satisfactory suggestions for handling the sewage sludge of inland cities. It can be made into bricks and has been made into a cement, but not at a cost to warrant such manufacture.

An experiment at Aylesbury, a town of 29,000 people about forty miles northwest of London, offers a probable solution of the problem for small cities. The A, B, C process of precipitation is used. The sludge is dried, ground with some sulphate of magnesia and sold under the name of native guano at \$17.50 a ton. The material as it issues from the filter press resembles oil cake, and is quite inoffensive. Ten hundred weight of it doubles a crop. It is reported to be better than stable manure or Peruvian guano.

The difficulty of applying the Aylesbury plan to London and other great cities, is that the immense proportion of inert mineral matter in the sludge reduces its value for manure out of all proportion to cost of handling.

To lessen this difficulty a combination of the systems of simple subsidence and chemical precipitation has been proposed by a Maj. Gen. Scott, of England, who appears to be acknowledged as an expert in sanitary matters.

This plan proposes to flow the liquid sewage from the mains first into great settling tanks, where the mineral matters in suspension are to be allowed to subside. It is calculated that two-thirds of the solid matter, nearly all mineral, will settle. Naturally some organic matter will be carried down. From these settling tanks the sewage water, bearing little but organic matter and that in solution, is to flow into a second set of tanks, when some defecating process, such as the lime process of precipitation, is to be applied to it. This is expected to yield a sludge so rich in organic matter that the manufacture of a fertilizer will be profitable. It is further proposed to enrich this organic sludge with superphosphates. The sludge of the settling tanks must be removed by barges or wagons, and may serve for filling low lands; if not, it must go out to sea. The effluent water, nearly pure, may be discharged as may be found convenient.

4. MECHANICAL FILTRATION.

This system, nowhere in operation except in an experimental way, is interesting because it is a Yankee invention, and because I believe it to point towards a simplification of the sewage problem.

Not many years ago a Mr. Hyatt, of Newark, N. J., invented an apparatus for filtering on a great scale water for house use and manufacturing purposes. An example was shown in the Minneapolis Industrial Exposition of 1886. This apparatus forces the water, treated with a solution of alum, through a filter bed of pulverized coke and clean sand. The novel feature is that of cleaning the filter bed by simply reversing the current for a very short time, once in say twenty-four hours. There can be no doubt of the efficiency of the Hyatt apparatus, on a moderate scale, for cleansing waters. A thousand towns and cities are already using it.

The claim is now made that this apparatus will filter liquid sewage effectually, and deliver the water purer than most unfiltered drinking water. As an instance: An experimental apparatus set up in Chicago has, it is alleged, delivered water purer than that of Lake Mich-

igan, as furnished by the city water works. Mr. Hyatt has lately made a proposition to the city of Paris to filter its sewage, guaranteeing to discharge the water perfectly pure into the Seine.*

The advocates of mechanical filtration are not bound more than other people to dispose of sludge, but Mr. Conant, editor of the *Sanitary Era*, a journal published to advertise the Hyatt filter, advocates with great earnestness a plan for purifying sludge with dry earth. His idea is simply to mix a sufficient quantity of dry earth with sludge to deodorize it, and to repeat the process until the mixture becomes a fertilizer equal in value to Peruvian guano. I do not learn that any machines or appliances have been devised for working this plan. It seems to me to be one of great promise, but the cost may postpone its introduction for a long time.

We have briefly described the systems of sewage disposition worthy of serious consideration.

They are, to recapitulate:

1. Simple subsidence.
2. Irrigation, with or without intermittent filtration.
3. Chemical precipitation of the whole sewage, or of a residuum after subsidence of suspended mineral matter.
4. Mechanical filtration

At the risk of unduly trespassing on the time of this meeting, I propose to devote the remainder of this paper to an answer to this inquiry: What, in view of past experience and present knowledge, may be reasonably undertaken by an inland city, such as Minneapolis in the way of cleaning?

Two things we presume: First, that the cleanings of a city are not to be dumped into rivers, lakes, or other waters, or deposited on lands where they will be a nuisance. The spectacle of a city of the size and pretensions of Minneapolis or Saint Paul, emptying into the Mississippi river thousands upon thousands of tons of solid and liquid filth and offal yearly is one to make angels weep and men blaspheme. Men who will hold the offices of mayor, alderman, or health officer, and not make it their first duty to lift their voices for some kind of civilized scavenging and sewerage are fit representatives of a people who are content to sit in the midst of their filth and pray the good Lord not to scourge them with tuberculosis, typhoid and diphtheria.

Exasperating as official inactivity may be, the mournful, humiliating part of the business is, that we, the people, are so blind, so ignorant, and so intent on living that we forget to live.

* *San. Era*, Dec. 15, 1887.

The first duty of a city is to clean itself, and dearly does any city neglect this duty.

Another thing to be presumed is, that the cost of thorough cleaning is a secondary consideration. A better statement would be that a thorough cleaning at any cost will pay; pay in the influx of population to a healthier city, pay in increase of values, pay in a lessened death rate, and a cleaner bill of health.

A third thing to be most heartily desired is the co-operation of a large body of intelligent cultivators to utilize the best at least of the fertilizing material now filling up and polluting the noble river which belongs to us simply to use and not to abuse. Upon these assumptions let us attack the practical question first proposed.

For clearness, let us recur to the classification of city filth already named. Four sorts:

1. Solids not excreta.
2. Excreta.
3. Foul water.
4. Rain water.

The first class, solids, consisting of street sweepings, dust, ashes, stable litter, garbage and rubbish should be collected systematically under compulsory regulations and removed.

House ashes, dust and garbage should be kept under cover till emptied in the public carts. Stable litter, if not removed by proprietors within reasonable time, should be carted off by the public scavenger and the expense charged upon the property.

Street sweepings are already removed by a public agency.

All of this service should be managed as a department of the city government, just as much as the water supply. It should be compulsory, and should be effective enough to keep all streets and alleys, all grounds and areas absolutely free from accumulations of filth. No syndicate or corporation should be allowed to levy a tax upon the people under the guise of a franchise.

The removal of this class of cleanings must be followed by assortment and ultimate disposition. In the first place, none must go into the river and none on to lands to be a nuisance.

Street sweepings, dust and ashes may go to filling low grounds until they shall be in demand for fertilizing.

Stable litter, garbage and rubbish may be "cremated," in whole or in part. The burning of this material is now rendered perfectly feasible by ingenious furnaces with two fire boxes. Cremation is no new device. The Gehenna of ancient Jerusalem was the perennial fire on which the offal of that holy city was consumed.

The second class, excreta, solid and liquid, is that whose prompt and innoxious removal is of first importance. There is no help for it but that excreta must go into the sewers, until the present fashion changes and better means of removal are organized. And better means might easily be organized. The power of common dry earth to thoroughly defecate night soil has been placed by experiment beyond all question. The day will come when all this material, purified by dry earth, will command a price, which will amply pay for more than the cost of removal. The city of Lynn, Mass., got a clean profit of \$2,176.25 from the composting of night soil in 1886. (San. Era, April, 1887). Minneapolis and Saint Paul waste \$50,000 worth apiece of good fertilizer each year.

As to the third class, foul water, i. e. house slops, and the liquid waste of manufactories; these go to the sewers—of course. In time, some manufactories may be required to purify their waste before emptying it into the sewers. This was frequently required in England.

As to surface water, the sewage question would be most simplified if rain water could be conducted away in separate pipes. But that seems almost impracticable in a climate like ours where pipes must be so deeply buried at so great cost. Until the time shall come when under every principal street there shall be an ample subway in which shall be accommodated all pipes for rain water, sewage, gas, condensed air, steam, and all electric wires, surface water, not escaping by the gutters and open mains, must flow into the sewers.

There remains now, the disposal of the sewage; consisting of rain water, foul water and excreta. Here there is room, not for indifference and uncertainty, but for caution and experiment. The plan must be adapted to the climate, and the topography of the city and its environs.

While experimenting with other plans it is perfectly feasible to adopt that of simple subsidence, letting effluent water, impure of course, flow into the river, and carting the sludge to a sufficient distance.

It remains to be determined by experiment whether sewage farming and intermittent filtration through soil, can be depended on where the snow lies for four months, or can be profitably practiced where the lands lie much above the outlets of the sewers. A sandy or porous soil at least, is almost a necessity to these methods.

The cities of Providence, R. I., and Worcester, Mass., after a long and careful study by their engineers of European and American experiments, have resolved to introduce a chemical precipitation sys-

tem. The Worcester plant is to cost \$300,000, and the annual expense of operating is placed at \$22,000.

In my judgment, there should be no delay on the part of our city authorities in observing the results of these New England experiments, and also of those in progress in Chicago and elsewhere, in mechanical filtration.

The ultimate disposal of sludge presents great difficulties, especially during our long and severe winters. It seems probable that some plan of drying will have to be adopted. What one, can only be decided after careful experimentation on the spot.

The plans to be tried would seem to be these:

1. Drying the whole sludge by means of filter presses, centrifugals, blowers and perhaps artificial heat.
2. Drying the whole sludge after mixture with dry earth.
3. Drying only the organic stuff caught in precipitation tanks after the subsidence of mineral matters in settling tanks. In cold weather it might be found necessary to dry this earthy sludge in order to handle it.

As to the value of our sewage sludge for fertilizing, that, too, must await the decision of experiment. Should the dry earth process of defecation be adopted, the stuff can be used over and over until it shall reach any desired degree of richness, and the sale of it would help to pay expenses. If demanded by cultivators, it could be enriched by superphosphates or other chemical manures. It is at this point that the co-operation of enterprising gardeners and fruit growers will be found indispensable.

Let me briefly recapitulate:

An inland city, like Minneapolis, has four kinds of filth to remove and dispose of:

1. Solid matter not excreta, such as sweepings, ashes, dirt, garbage, rubbish, and stable litter.

These must be collected, assorted and carted to convenient centres. Garbage and rubbish and stable litter should be burned, except such stuff as may be taken for manure. Other solids should be in demand for fertilizing and filling low grounds.

2. Rain water, to go off by open gutters and into the common sewers.

3. Excreta.

4. Foul water.

These two to the sewers.

Our four classes reduce then to two:

1. Solid matter, to be cared for above ground.
2. Fluid matter, to go into the sewers below ground.

The fluid sewage must be purified and deodorized, and the water turned off pure enough to enter any decent river. The solid residue must be handled in such of the ways indicated above as experiment shall show to be most efficient and economical.

Meantime we are in Minneapolis lavishing hundreds of thousands of dollars upon a system of sewers planned to empty the liquid filth of a great city into the Mississippi river. It may be we cannot stop where we are, but from this instant our engineering talent should be devoted to such a modification of plans as may render the sewers we are now laying of some use in a system of the future, designed to discharge its contents at some convenient point for purification.

The city will not be allowed to discharge its filth into the Mississippi river indefinitely. Mighty as that stream is, it is not big enough to dilute and deodorize the sewage of a hundred towns and cities seated on its banks and tributaries. The national government will soon be invoked to preserve this great waterway from pollution, or if not, the riparian cities of our own State will soon be knocking at the doors of its capital for protection against the stinks and offal of the dual cities.

It is none too soon to attend to the problem of caring for own filth. We may now handle it at leisure and with composure. If we neglect it, we may be forced suddenly to adopt hasty plans, and expend millions, only to find those plans unsuitable.

At the conclusion of Prof. Folwell's address, on motion, he was given a vote of thanks, and the address was referred to a special committee, consisting of Messrs. Owen, Gray and Hillman, to take suitable action thereon.

DISCUSSION.

Mr. Pearce. Mr. President, the paper read by Col. Folwell was grand. This subject has been under consideration for some time past by our market gardeners. If this surplus material can be carried back to the soil where it belongs, and utilized, it will prove of great advantage, and we hope the municipal corporation of this city will aid us in this grand and useful enterprise.

Mr. Harris. This was a very important subject. As soon as the people of LaCrosse began to use the water of the Mississippi river some sort of scourge broke out, and many were taken off by diph-

theria and other diseases. If Minneapolis and St. Paul were to dispose of their city cleanings by using the river for a dumping ground, they should be held liable for such conduct. He hoped some action would be taken to prevent this, from the very source of the river itself to where it empties into the sea.

Mr. Underwood said he had occasion with a small party to take passage in a boat in the summer from St. Paul, and to proceed down the river as far as Lake City. The amount of sediment and offal observed on the occasion was something he had not dreamed of. He thought something should be done to prevent the father of waters from being polluted in that manner, and used to drain the sewers of these large cities.

Mr. Gray said when this subject came up before the county society, one of the health officers of the city had met with them and assured them that they should have the co-operation of himself and of the city council in their effort to dispose of city garbage and getting rid of all this filth. That was the question a committee now had before them. It was hoped arrangements could be made with the railroads for removing stable manure to different points near the city where it could be used. He thought street sweepings one of the best fertilizers to be had, and the question was how to get them from the city. Some of the rubbish was of no value. There were questions in regard to this subject that required much thought and consideration in order to make any definite proposition to the city council. As a rule aldermen knew very little about the subject of city sanitation, and many of them cared very little about it, either.

Mr. Cleveland. Mr. President, this discussion has brought to my mind the method considered for the disposal of sewage in Chicago some years ago. At one time I found some members of my family were suffering, and we attributed it to the use of river water. Since living in this city I began the use of very pure water, brought in from Glenwood springs. The disease known as winter cholera; we hear of it everywhere; we had it in Chicago in the winter of 1880-1; it was an epidemic that was almost universal, and scarcely a family escaped. I hear a great deal of it here, but I have had no case of it in my family. I haven't known a family that used the spring water that have suffered with it. It occurred to me that possibly it might be the river water that caused the winter cholera.

In Chicago it is claimed the crib is so far out from the shore that no impurity from the city could reach it, but that never entirely satisfied me; I always felt nervous about the Chicago water. I suggest this

for others to consider whether it may not be the river water that is responsible for what we are suffering here this winter.

President Elliot. To give some idea of the amount of stuff we are turning into the river here, I would state that our health officer stated at the meeting referred to by Mr Gray, that the city was dumping into the river from two to seven hundred wagon loads per day.

Mr. Pearce. It means thousands and millions of dollars wasted.

President Elliot. The market gardeners do not properly estimate the value of this material that is being wasted, and see the necessity of saving it and carrying it back upon their lands. They are coming to that point rapidly. It is high time some method was devised for disposing of this material, and having it deposited on the land in proper shape.

Prof. Folwell. I would like to hear from some nurseryman of the neighborhood as to how far fertilization is necessary, and how much can be used.

Mr. Pearce. We can use seventy-five loads of manure on an acre; our market gardeners are using that quantity now of stable manure. In the vicinity of Lake Minnetonka we could use that amount per acre on a section of land. We ought to have it, and the amount of manure that could be supplied by the city of Minneapolis is inadequate to supply the demand.

Mr. Gray. We calculate to use from fifty to seventy-five tons to the acre. If we use cow manure we put on fifty tons per acre, and if we use coarser material mixed, we put on still more. It is not profitable in market gardening operations to lower that amount any one season. If we do there is a falling off in the crop produced.

President Elliot. We would like to hear from Mr. Hale, the secretary of our board of trade.

Mr. Hale. Mr. President, I guess I have got into the wrong place, but perhaps I can manage to get out. I have never been more interested in my life than by the reading of the paper just read by Col. Folwell, and for various reasons. Later on I may have occasion to speak of what I have done in my own garden.

When you come to take into account, Mr. President, that it is no longer ago than 1837 when Franklin Steele, now dead, entered the first land on the other side of the river, it is but a short time. Since that time a city has grown up here of 160,000 or 170,000 people. Every man that has come here has come with the intention to benefit his condition financially. Taking into account the shortness of the time and the object of the people in coming here, there has not been

time to do everything. But the time has now arrived, and if I am not greatly mistaken, necessity will settle the question before long, as to the sanitary condition and the course to be taken. I believe it is all wrong to adulterate the waters of this river that our neighbors of even St. Paul or below should be injured thereby. But up to this time there has been no way to avoid it. I believe that all the manure of whatever kind can be used within a circuit of a few miles around this city, to very great profit, and the city be benefitted thereby in every respect. Of course the first consideration is that of public health.

Mr. Cleveland has referred to winter cholera. I would state that my wife is a very particular person; she believes the freezing of water purifies it to a certain extent, and she uses no tea or coffee except from melted ice. I can't exactly see how it has any effect, but she still insists that it is the best way and I do not object to it. She would have her way, you know, anyhow, Colonel, and I am glad I am not alone, [Laughter.] This is true, however, there has been no member of our family afflicted with the disease this winter; there may be something in it.

In regard to fertilizing a garden I have had some experience, as I have a small one. You may have been by it several times.

President Elliot. It is a good one.

Mr. Hale. I do know that I never had success in gardening in the past ten or fifteen years without manure. The great trouble with the people in this northwestern country is they try to get over four times as much ground as they can take care of properly. The profits of the farmer would be increased vastly if a great deal more manure were used per acre.

I have three-eighths of an acre in my garden and the buildings occupy a portion, but I raise more garden vegetables of all kinds on the portion devoted to that purpose—three or four times as much as my family consumes. Every year my milkman draws me three or four loads of manure which is used on the land. One year it was a little too heavy and not thoroughly mixed. But the point I am driving at is that the fertilizing material of this city can be profitably used in the surrounding country here and our citizens and the farmers mutually benefitted.

I have been interested in and gratified to see the agitation in regard to this matter by the local society here; I hope the question will be pressed and some means devised for the disposition of all this waste material. I believe in thoroughly manuring the soil. I never had

much success in farming unless I put into the soil a little more than I took out.

Mr. Pearce. Market gardeners are many of them beyond the reach of this manure and it is necessary that it be taken to the country by the cars.

Mr. Hale cited the instance at Chicago, in the vicinity of the stock-yards, where the offal was disposed of in that manner and taken considerable distance.

Mr. Pearce thought there was no great obstacle in the way of the removal of this material in that manner.

Mr. Hale. The various railways could remove it to the different sections of country where most needed; they would doubtless haul it at a nominal rate.

Mr. Pearce said this was an important matter. If market gardeners were to supply the demand for vegetables in the city they should take steps to obtain the necessary material to fertilize their lands properly.

Mr. Cleveland. Mr. President, nearly forty years ago I was engaged in fruit raising and market gardening on the Delaware river, some twenty miles above Philadelphia. I was then a pretty active member of the Pennsylvania and New Jersey horticultural societies, and this question we are discussing to-night used to come up very often. We were very anxious, many of us, for a proper solution of the question. There were various companies started. I remember a certain professor in New York City recommended an article called "Poudrette," and there were companies formed in different cities for utilizing the garbage of cities. I do not know whether it is still manufactured or not. It used to be made very extensively. We used to get stable manure from Philadelphia, which was brought up on sloops, and landed on the banks of the river. A good many farmers used "Poudrette," and it was but a short time until it was such miserable stuff it was scarcely good for anything. The genuine article was valuable as a manure; but there are people who, if they can buy a sham article that is a little cheaper, will get it and think that is economy. But I know I preferred a sloop load of Philadelphia manure to all of that stuff they could bring me.

On motion, the meeting then adjourned.

MORNING SESSION.

THIRD DAY, THURSDAY, JAN. 19, 1888.

The meeting was called to order at 9 o'clock by President Elliot.

Mr. Cleveland was given an opportunity to address the Society at this time and came forward and said:

THE AMERICAN POMOLOGICAL SOCIETY.

Mr. Cleveland. Mr. President, I was asked by your Secretary last evening if I was connected by the Pomological Congress, and I made reply that I took an active part in the convention when that congress was formed, and I was asked to give to-day some reminiscences of it.

I am sorry to say that while I had in my possession all the reports and published accounts of the convention at which that congress was first organized, they were all destroyed in the Chicago fire, when my office was burned and everything in it. So that all that I can tell you of it is from my own memory. I was at that time corresponding secretary of the New Jersey Horticultural Society, and was taking a very active part in horticultural matters, and I was sent as a delegate from New Jersey to New York, to meet delegates from the Massachusetts, the Pennsylvania and other horticultural societies, with a view to the organization of a national pomological congress. We had a very interesting session in New York. I think that was in 1848.

I remember there were a great many of the leading pomologists of the country present at that time. We elected Marshall P. Wilder president, and he continued the president of the congress till his death, only a year or two ago; he was re-elected time after time.

Mr. Sam Walker, who was afterwards president of the Massachusetts Horticultural Society, took a very active part in the proceedings; also Caleb Cook and A. J. Downing, Mr. Ernst, of Cincinnati, and Mr. Patrick Barry, of New York. Mr. Barry was the secretary, and the Pomological Congress was then organized, and held several subsequent meetings at Philadelphia and elsewhere. I attended regularly and with a great deal of interest, and always considered their work very valuable.

Mr. Wilder was the best manager of a public meeting that I have ever known, perfectly firm, frank and straightforward, in all respects, securing the respect and good will of all who listened to him; a man

of a remarkable combination of character, genial and pleasant. The last time I met him was in Chicago, when some six or eight years ago the pomological convention met there. I had not attended their meetings for a number of years, as they were held in the east and I was then fixed at Chicago; but I spent the day with him and met some of my old friends. I had been engaged in laying out parks in Chicago for some years then, and of course took a great deal of interest in showing my old friends what I had been doing there, and they rode around with me and we spent the day together, and had a very pleasant banquet in the evening, which was attended by the merchants of Chicago.

In 1882 I was invited to read an address on forestry to a committee of the Massachusetts legislature. A petition had been sent to the legislature for an experimental forest, under the auspices of the state, and the committee to whom it was referred invited me to read a paper on the subject, which I did. Afterwards the Illinois department of agriculture asked for it to be published in their transactions; I sent them a copy and they published it. And I sent copies of the pamphlet to different friends, and among them one to Mr. Wilder. He sent me the following characteristic letter in reply which I want to read to you. It was the last communication I had from him; here it is:

LETTER FROM MARSHALL P. WILDER.

DORCHESTER, July 4, 1882.

"Thanks, my old friend, for your excellent document on native forests. It is a capital paper. Go on with the good work; it will be a blessing to future generations. Received horticultural documents.

Yours as ever,

MARSHALL P. WILDER."

As I say, the Illinois department published this pamphlet. I have given them away as opportunity has offered. I don't like to give them where they are not appreciated, for I don't approve of "casting pearls before swine," but I felt so sure they would be appreciated here that I brought a lot of them, and which I beg that the gentlemen present will help themselves to if they care to take them home.

President Elliot. This is very interesting to me, especially, as I have had the privilege of meeting Marshall P. Wilder at several of these pomological conventions. This incident brings up many memories in my own mind of a pleasing nature. We hardly realize the great loss the country sustained in the death of Marshall P. Wilder,

but he had done a good work, and he has left a monument after him, surely, that will remain with the American people for ages.

Mr. Harris. Mr. President, I think we can all say that the work of Marshall P. Wilder did not die with him. I believe all over this North America there are thousands of men whom he educated in horticultural pursuits and who gained inspiration from the life and example of Marshall P. Wilder and a love for the cause he adorned. For myself, I can say he was a man who for over thirty years I looked up to as one worthy of emulation, and I feel that we have had no superior in this country in this field which he occupied. He had thousands of friends, and I hope we will keep his memory green in all our horticultural meetings while we live, and that those who come after us may partake in a large degree of the same inspiration.

Mr. Wilcox. Mr. President, I wish to add one word to what has been said concerning the memory of the venerable Marshall P. Wilder. It is a cause of the greatest discouragement to our younger members, and to practical horticulturists of the present generation, when we look at the many chairs left vacant and to be filled, by the death of distinguished pomologists of this country; and among the greatest of these was Marshall P. Wilder. Now, gentlemen, we have one consolation, and that is that the study and the love of horticulture is very much like some diseases, in that it clings till death. Where can we find a man with a name who has once been really interested in this work, and who has once devoted his thoughts and study to the promotion of horticulture that ever left it until his voice was stilled in death?

We have seen this illustrated in the case of such men as the Downings, Mr. Wilder and others, and we have among us now such men as T. T. Lyon, of Michigan, those who are devoting their life work to the interests of horticulture. One characteristic about Marshall P. Wilder was, while there were those that were intimate with him and knew him best could not see the brilliant genius that distinguished some men, still there was that invisible influence about him that no one could meet him without being attracted, and leaving him to remember and admire him forever afterwards.

Mr. Cleveland. What the gentleman has just remarked upon the influence of horticulture reminds me of an anecdote, which I trust will prove sufficiently interesting to pardon my using it. On one occasion I went from New Jersey with a delegation to attend the great triennial meeting of the Massachusetts Horticultural Society, by invitation. The gentlemen who went with me were strangers in Mas-

sachusetts, and as that was my old home I took them to show them what was most interesting in the vicinity of Boston, in connection with every specialty, and among other places I took them to the garden of old Samuel G. Perkins, a brother of Col. Perkins, a man of large fortune, and who has been many years retired from business, devoting himself most zealously to horticulture. We found him past eighty years old and nearly blind, seated on a camp stool in his garden pruning his pear trees, and guiding himself along where to cut by feeling. He could tell a fruit bud from a leaf bud by feeling; and on some of my friends blaming him and expressing their gratification at seeing such self-interest in the cause at such an age, he made a remark that has clung to me ever since, and of which I am reminded by what you have just said:

"Gentlemen, the love of gardening has this advantage over any other taste, that it forces a man to labor as long as he lives; and labor, gentlemen, is the greatest blessing God ever gave to man."

Col. Stevens was here requested to read a paper prepared by him upon Indian foods:

WILD FOOD.

By Col. J. H. Stevens, Minneapolis.

Mr. President, Ladies and Gentlemen:

I am requested to hand down to this generation the varieties of the primitive or wild food incident to this soil and climate from which the Indians used in part to subsist on.

The lamented Philander Prescott, who was so brutally killed by the Indians on the nineteenth day of August, 1862, informed me in 1849 that when he came to the Northwest in 1819 the natives depended much on this wild food. In most instances it was easily gathered, and I found that while among the Indians in an early day, that even a white man would soon become fond of the wild sweet potato and one or two other varieties of the wild tubers the squaws used to serve up to us.

According to Mr. Prescott the most prominent varieties of wild product used by the Indians were the mendo or wild sweet potato, yessenah or wild prairie turnip, panhe or artichoke, omenechak or wild beans, psen-chin-chah or swamp potato, pesich-ah, towahapa or wild rice.

The mendo, or wild sweet potato, is found throughout the valleys of the Mississippi, Minnesota, and other streams in the central part of

Minnesota. It grows about the bases of bluffs, in rather moist but soft and rich ground. The plants resemble the sweet potato, and the root is similar in taste and growth. In a letter to Hon. Thos. Ewank, dated Nov. 10, 1849, a copy of which I have in my possession, Mr. Prescott says: "It does not grow so large nor so long as the cultivated sweet potato, but I should have thought it the same were it not that the wild potato is not affected by the frost" The Indians simply boiled them in water when being prepared for the table. I have intended to have made experiments in the cultivation of the mendo, believing they would bear civilization, and perhaps when perfected a new variety of sweet potato of great value would be added to our products. I regret much my negligence in this matter.

The tip-sne-ah, or wild prairie turnip, grows on the high native prairies, one or two together, in size from a small hen's egg to that of a goose egg, and of the same form. They have a thick black or brown bark, but are nearly pure white inside, with very little moisture. They grow about six or eight inches below the surface, and the Indian women used to dig them with a sharp pointed stick forced into the ground and used as a lever. They were boiled and used by the Indians in the same manner we use our turnips. They were frequently split open and dried for winter use by the squaws. When dried they resembled chalk. Mr. Prescott thought that when thus dried they could be ground into flour and that they made a very palatable bread. The pang-he, or artichoke, grows where the land is rich, near fallen or decayed timber. It was only used for food when the Indians were very hungry. The Omen-chah or wild bean was found in all parts of the valleys in the old territory where the land was moist and rich. In regard to this plant Mr. Prescott says: "It is of the size of a large bean, [with a rich and very pleasant flavor. When used in a stew, I have thought them superior to any garden vegetable I had ever tasted."

The Indians were very fond of them, and pigeons get fat on the product in the spring. The plant is a slender vine, from two to four feet in height, with small pods two to four inches high—with small pods two to three inches long, containing from three to five beans. The pod dries and opens, the beans fall to the ground, and in the spring take root and grow again." There is no question in my opinion but what this plant could be successfully cultivated and civilized.

The psen-chin-chah, or swamp potato, was found—and I suppose it is so to this day—in the mud and water about three feet deep. The leaf is as large as the cabbage leaf. The stem has but one leaf, which has, as it were, two horns or points. The root is obtained by the

Indian women; they wade in the water and gather the roots. It is of oblong shape, of a whitish yellow, with a few black rings around it, of a slightly pungent taste, and not disagreeable when eaten with salt or meat.

The psen-chah I believe to be of the same family as the last but the tuber not so large. The stem and leaf are similar, but grow in deeper water. The Indians are very fond of them. Both of these tubers are found in large quantities in the muskrat lodges, stored by them for winter use. It is not saying too much to call them a luxury.

The ta-wah-pah is another tuber, or rather a root, that the Indians esteem highly as food. Like the two preceding, it is a water product. The stem, leaf, and a yellow flower is like the pond lilly. It is found in the lakes, in water and mud from four to five feet deep. The Indian women used to gather them in large quantities. The root is from one to two feet in length, very porous; there are as many as six or eight cells running the whole length of the root. It is slightly sweet and glutinous. The Indians generally boiled it with wild fowl, but often roasted it in the absence of wild game. All of these roots were preserved by the Indians for winter use, by boiling and then drying them over the fire, or in the sun.

The greatest product of all was the wild rice, at least as an article of food, of which the Indians themselves gathered instead of the women. They used it in all of their great feasts. It was found—and I suppose it is to this day—in lakes and streams, where the mud and water is from three or four feet deep upwards to ten or fifteen. The rice harvest was a short one. It was only of a week's duration. When ripe the slightest touch shakes it off, a strong wind of short duration scatters it in the water. The Indians obtained it by paddling a canoe among the rice, when with a hooked stick they drew the stalks over the canoe and whipped off the grains. They continued to push the canoe on and whipped off the rice until the canoe was full, then carried the cargo to the shore, unload, fill again until the season was ended.

To dry the rice they erected scaffolds about four feet high, eight wide and twenty to fifty feet long, covered with reed grass. On these the rice was placed and dried by a slow fire kindled under the scaffold and kept burning about a day and a half. The beard is longer than that of rye, and to remove it and the chaff the Indians made a hole in the earth about one foot wide and one foot deep, in which they placed a skin, and put about a peck of the dried rice at a time in the hole. Then the Indian, holding himself by a stake planted

near, stamped off the heads. It is then cleaned and stored for future use. It is of a dark color, and many of the pioneers prefer it to the California rice. I never did, but frequently in an early day was obliged to eat it or go hungry.

I do not pretend to give the botanical name to these products. I prefer to let them remain in their own native Dakota, just as Mr. Prescott left them so many years ago.

On motion, a vote of thanks was given Col. Stevens, with the request of a copy for publication.

The following paper was read by Mr. Owen, editor of *Farm, Stock and Home*:

FORESTS AND MINES.

THE RELATION OF OUR UNDEVELOPED IRON AND COAL MINES TO OUR OVERDEVELOPED FORESTS.

By S. M. Owen, Minneapolis.

Mr. President, Ladies and Gentlemen.

This country has now reached a period of intellectual and material development so advanced that new problems are constantly presenting themselves, as new scenes present themselves to the traveler in a strange country. As a nation we have driven such a furious race behind the spirited steeds of progress that we have forgotten everything save the exhilarating sensation of our rapid ride; have been oblivious to the terrific strain to which carriage, steeds and rider have been subjected; have been indifferent to a possibly useless waste of energy and misuse of resources. We have been forgetful of the past and thoughtless for the future. If we feel any gratitude toward our ancestors, the sentiment is not powerful enough to properly impress us with our obligations to posterity.

This unwise, even dangerous, indifference of the present regarding the future is manifest in a thousand ways, but it is my purpose to call your attention to but one of them, though that one is by far the most important of all, for it is one that is leaving in its wake the most of danger and calamity; I allude to the destruction of the forests of our country.

I do not propose to touch upon the climatology of this subject. I

assume that every one of you know how important a factor that is in the forestry problem; but if anyone of you do not, I am certain you have those among you who can discuss that phase of the subject more intelligently than I can. I will not stop here even to discuss the governmental absurdity of giving timber destroyers an immense bounty for demolishing the great forests which temper the north winds to our suffering fields and fruits, while at the same time it gives liberally for planting trees to modify the winds from the west!

My purpose is to give some well authenticated statistics of the present condition of our forests, the rate at which they are being destroyed, their probable duration if the present rate of destruction is maintained, and to suggest means of supplementing them with other resources. It does, indeed, seem incredible that this country, yet in its infancy—as the lives of nations are estimated—and which was endowed with a wealth of timber regarded as absolutely inexhaustible, should enter the front door of the second century of its life to be there confronted with the most melancholy of all problems, that of an insufficient timber supply—a timber area so narrowed that processions of climatic calamities are almost constantly on the march by reason of the narrowness. But however incredible this may seem it is not the less true; shut our eyes to the fact as we may, or sing never so sweetly our bounty-paid lumber lords to the contrary, the present condition of our forests is deplorable. The insufficiency of our timber supply is already appalling, and daily growing more so, because—paradoxical as it may seem—parsimony and extravagance are running a joint race of devastation and waste!

The figures which I am about to present for your consideration are authentic and reliable, and I would have no one consider them as the emanations of an alarmist's brain, or unworthy of attention. It is said that our Western and Northwestern mills have in forty years destroyed the timber that it took two hundred years to grow. The capacity of the present mills in the South is sufficient to exhaust the valuable timber in that region in twenty-five years, and it would take from one hundred and fifty to two hundred years of intelligent timber culture to renew the probable destruction of the next twenty-five years. There are yet enormous belts of timber on the Pacific coast, yet careful calculations have demonstrated that when that supply is drawn upon for the nation's needs—as it soon must be if something is not done to check the present frightful consumption and reckless waste—it cannot possibly last over fifty years.

It requires a serious contemplation of the almost inconceivable con-

sumption of timber in this country to enable us to be incredulous regarding its claimed insufficiency. If your minds can grasp the following figures, you will be better able to appreciate the forestry situation. Careful estimates, based on the most laborious and painstaking research of the forestry division of the national department of agriculture, place the annual consumption of timber at 20,000,000,000 cubic feet—240,000,000,000 feet of lumber; or, if we now number 60,000,000 people, 4,000 feet for each man, woman and child in the land. This amount is made up as follows:

For lumber market and wood manufactures, 2,500,000,000 cubic feet; railroad construction (new construction, based on the average of the past ten years), 360,000,000 cubic feet; charcoal, 250,000,000 cubic feet; fence material, 500,000,000 cubic feet; fuel, 17,500,000,000 cubic feet.

These amounts are actually used, but they do not comprise the total of forest depletion; for our wasteful practices, culling and thinning forests (leaving the residue to die), and conflagrations, add from twenty-five to fifty per cent to the already enormous total. * It is known that the carefully protected and intelligently cultured forests of Germany make an annual growth of fifty cubic feet per acre. If our forests were making a corresponding growth—which no intelligent forester will admit—on the basis of the lowest estimate of loss by waste and fire, it would take the growth of 500,000,000 acres to keep pace with our consumption.

Four years ago a careful canvass was made to determine the forest area of the United States. Including the previously mentioned Pacific coast belts, and the vast timbered regions of Alaska, we have a total of only 489,280,000 acres. It is unsafe to estimate the annual growth of our forests at over-one-half those of Germany, of twenty-five per cent; and it is certainly not unreasonable to put the loss by waste and fire at thirty-five per cent—less than an average of the various estimates. This gives a total consumption of twenty-seven billion cubic feet, and an annual growth of only 12,231,000,000 cubic feet! Appalling as these figures are, they do not tell the whole story, for it is admitted that many of the above estimated forest lands do not possess a foot of valuable timber—are but swamps of brush, hill-tops of scrubs, and worthless second growths on former timber lands.

It is my candid opinion that the citizens of the United States never were confronted with a more serious problem than the one now under consideration. They never were confronted with a problem which

demanding more intelligent or more radical treatment, nor one fraught with more importance to the future dwellers of this land, which God made so fair and endowed so richly.

In what direction does duty lie, must be our first thought; that point settled, duty's paths must be trodden persistently and uncompromisingly. No consideration of a public or private nature must be considered paramount to this one. Investigation will reveal the fact that this question is provided with two duty paths; one is the planting of timber, the other is the preservation of that which we yet possess. Concerning the importance of the first duty we are all agreed; though it must be admitted that we have not pursued this path with the energy, ability, nor to the extent that the exigencies of the case demanded. Tree planting in this country is as yet but a vaguely defined sentiment. In many localities, on many farms, this sentiment has crystalized into fair timber belts and thrifty groves; these are, however, but drops in the vast ocean of desolation which has washed over and well nigh obliterated our once magnificent forests.

But I do not propose to discuss this end of the subject. Change the sentiment of tree culture, if you will, into a great intelligently organized fact; make it a government work of unparalleled magnitude and efficiency, and yet that will be following but one of the paths of duty to which I have alluded.

Let us now consider the matter of stopping the unnecessary consumption and preventing needless waste. Right here allow me to say that governmental forest planting co-existent with government encouragement of forest destruction, is a bung hole waste and a spigot saving policy so idiotic that our posterity will be amply justified in derisively laughing at our folly; and it is a policy that cannot be changed too quickly.

If we have any resources which can be made to supplement the one of timber, we should surely hasten to utilize them; if we have any reinforcements which can aid our forests in holding their own against the vandalism which is now so rapidly destroying them, we should not hesitate a moment about enlisting them in the holy cause. The reinforcements are at hand; we possess them in untold quantities, and they are marvelously easy of access; these great resources are coal and iron.

We are burning 17,500,000,000 cubic feet of our precious forests every year. At the same time we possess two-thirds of the known coal of the world, but it is so hemmed about by unnatural trade laws, and so dominated and controlled by capitalistic combinations that it is

made one of the luxuries of life, bearing a higher price than in any other country of the globe, and hence enormously and unnecessarily augmenting the consumption of wood. I will not waste words on this branch of the subject; I feel that it would be an insult to your intelligence to enlarge upon so palpable an absurdity. Of iron and its possibilities as a timber saver I must have more to say. First, allow me to quote so much of the report of the United States commissioner to the last International Exposition held in Paris, as refers to our natural wealth of coal and iron. It so tersely calls the roll of the reinforcements I am now considering that I think it can but interest you.

Along the Atlantic slope, in the highland range from the borders of the Hudson to the State of Georgia, a distance of one thousand miles, is found the great magnetic range, traversing seven States in its length and course. Parallel with this, in the great limestone valley which lies along the margin of the coal fields, are the brown hematites, in such quantities at some points, especially in Virginia, Tennessee and Alabama, as fairly to stagger the imagination. And, finally, in the coal basin, is a stratum of fossiliferous ore, beginning in a comparatively thin seam in the State of New York, and terminating in the State of Alabama, in a bed fifteen feet in thickness, over which a horseman may ride for more than one hundred miles. Beneath this bed, but still above the water level, are to be found the coal seams, exposed upon mountain sides, whose flanks are covered with magnificent timber, which can be used for the purpose of manufacturing charcoal iron. Passing westward, in Arkansas and Missouri, is reached that wonderful range of red oxide of iron, which, in mountains rising hundreds of feet above the surface, or in beds beneath the soil, culminates at Lake Superior in deposits of ore which excite the wonder of all beholders; and returning thence to the Atlantic slope, in the Adirondacks of New York is a vast undeveloped region, watered by rivers whose beds are of iron, and traversed by mountains whose foundations are laid upon the same material; while in and among the coal beds themselves are found scattered but rich deposits of hematite and fossiliferous ores, which by their close proximity to coal and a market makes possible the development of an iron industry such as the world never saw. From these vast treasures the world might draw its supplies for centuries to come, and with these the inquirer may rest contented, without further question; for all the coal of the rest of the world might be deposited within this iron rim, and its square miles would not occupy one-quarter of the coal area of the United States.

In very truth it may be said that iron and coal are almost as plenty in this country as dirt! They are almost as boundless as "the empty, vast and wandering air." We have all the materials for iron making in conjunction, and all of them above water level! From their beds they can be carried by their own gravity to the smelting furnaces and rolling mills. In no other country on earth do such conditions prevail; in no other country do they even remotely approximate them! This certainly means that iron can be easily and profitably produced in the United States at a lower price than in any other country, for in all other countries materials must be mined from great depths and brought together from long distances.

Now, with cheap iron given us, what will we do with it, how make it supplement timber, and lessen the consumption of wood? I answer, in a thousand ways! But I will call your attention to but a few. One of our most remorseless timber destroying agents is the railroad. The timber it uses is of the very best. The element it takes from the forests is analagous to the youth of a nation. The prime, sturdiest, most promising representatives of the forest are sacrificed to the demands of the railroad. Whether for ties, bridges, culverts or cars, nothing but the freshest, purest blood of the fast disappearing aristocracy of trees will satisfy the appetite of the railroad giant. Five hundred and ten million cubic feet of such timber is used annually for ties, bridges and telegraph poles alone. Estimating the annual growths of our forests at forty cubic feet an acre, it takes the growth of 12,750,000 acres to provide for these three items, *and every cubic foot of them should be iron!*

Iron bridges and culverts for railroads should be made compulsory by law. The London *Daily News*, in commenting on that terrible disaster at Chatsworth, last summer, said: "And the strangest thing about this strange, sad accident, is that the culvert was made of wood." Strange, indeed, must it have seemed to an intelligent Englishman; and it should be made impossible by intelligent Americans!

The iron railroad tie is no longer an experiment. It has been in use in Europe for twenty years, and substitution of iron for wooden ties is now being made there with marvelous rapidity. In Germany, Switzerland and Holland one-eighth of the entire railroad mileage was supplied with iron ties as long ago as 1884. At the present time the percentage is much larger, and is rapidly growing. Even in sleepy old Mexico, on one railroad alone from forty to fifty thousand iron ties are being put in every year. This substitution of iron for wood is done in the interest of economy; but this interest does

not obtain in this country, because of the economic anomaly existing here of a scarcity of timber at a low price and a plethora of iron at a high price. Does it not behoove the lovers of trees, and those who are considerate of posterity, to do what they can to destroy such an economic anomaly?

England mines her coal from narrow seams deep in the bowels of the earth; is compelled to import more ore than she mines, to enable her to make the kind of iron and steel the world wants, and is selling ties to Holland, Switzerland and Mexico, while the United States goes on remorselessly devastating her forests, because the price of her iron is too high to be substituted for wood! Instead of the highest, we should have the lowest priced iron in the world. Then we could not only have railroad ties of iron, but bridges, culverts, telegraph poles, cars and depots of the same material. We could have iron wagon bridges and culverts; our homes might be shingled with iron; our corn cribs and granaries built of iron; and these great buildings which we see going up around us every day of massive brick and stone walls, but great lumber yards for interiors, would be more cheaply built, and infinitely more permanent and safe if iron were used instead of wood. We should be living in a golden age of iron, dominating and controlling the world's markets, instead of blindly ignoring the great wealth at our feet, and constantly looking up to estimate the market value of every noble tree our eyes light upon.

Now, ladies and gentlemen of the Minnesota Horticultural Society, let me say in conclusion, that this question is one that must not be looked at from the standpoint of partisan prejudice, nor of past or present predilections. It is a new question; it has a significance now it did not have when forests were believed to be inexhaustible. The relation of forests to mines has become so close that one cannot be intelligently discussed or treated without considering the other. As our duty to God and our children is above every other duty, so is this question above party creed or party allegiance.

I have presented these facts to you because you are the conservators of the forestry interests of your section of country. My object is to point you towards a means of protecting and preserving your ward, which possibly may not have occurred to you. I trust you will see it as I do; I hope you will not ignore the points I have made simply because they may seem Eutopian at the first glance, or impossible of realization. I desire you to first ask yourselves if the points are right, if they are reasonable; and if you decide them to be so, and do what you can to so mold legislation that the desired end will be attained,

you will be conscious of having done your duty; and whether you succeed or not, you may be assured that posterity will not forget to bless you for the efforts you made to bequeath to it the priceless blessing of thrifty and sufficient forests.

The intelligent conservatism of this Society is known and acknowledged all over the land; and if it should start a discussion of the forestry problem from a standpoint similar to the one I have but imperfectly outlined, I feel satisfied that it would go a long way towards inaugurating a crusade for economic and commercial methods that would eventually prove of inestimable value, not only to our forests, but to our industrial system. It is not necessary for me to suggest to this body the danger of a fanatical or dogmatical agitation of this question. If he whose cause is just is thrice armed, then you have weapons in your hands so potent that calm reason is the power to wield them, and not fiery fanaticism.

In pursuing the present policy we are, I feel satisfied, committing a great wrong against ourselves and a great crime against posterity. The wrong must be righted and the crime must be stopped. Some day the war for the right will be waged on this line. It is none too soon to declare the war, nor is there a more appropriate place to declare it than in this region, where the first and greatest suffering will be experienced, for here we will have the fewest forest trees, yet will have the greatest need of them.

DISCUSSION.

Mr. Sias. Mr. President, I move that we place this most excellent paper on file, and the author be tendered a vote of thanks, and also request its publication in the *Farm, Stock and Home*, and that members of this Society be furnished with copies.

Col. Robertson. Mr. President, I am glad to be here, and to have an opportunity to listen to this paper. It is one of great importance. I have read much, studied and inquired much concerning this subject, and I must say it is the best presentation of it I have ever heard, the most complete of anything of which I have any knowledge. It is enough to distinguish the gentleman who is the author of it, and it is a credit to our State. We are not happy hyperboreans here, but as he has characterized us, we are the finest body of men in the world intellectually and physically. But it is time, as shown by this document, for we will be compelled to leave this country, or our children after us—we cannot live here—we might as well go to Greenland or Ice

land to live—unless we become interested in forestry and plant trees to protect the people. We ought to have a thousand copies of this paper published immediately, and it ought to be distributed widely. We must commence this work of national defense. The war of the rebellion and all other wars possible cannot do the damage that this work is now doing, in order to satisfy the avarice and greed of men, and in consequence of their ignorance, at least many of them. I want a hundred copies of this myself, and I will send them to scientific men throughout Europe, and those who are interested in forestry generally.

Col. Stevens said he hoped the motion would be adopted, as the paper was a valuable one.

Mr. Harris moved to amend the motion by authorizing one thousand extra copies of the paper to be published at the expense of the Society, not exceeding twenty-five dollars. The motion was carried.

Mr. Thompson said he would order a hundred copies for distribution in Iowa.

Col. Stevens. Mr. President, we have an honored member among us in the person of Col. Robertson, who for many years has been traveling in Europe for the purpose of gaining information in regard to agricultural matters and everything pertaining to the benefit of mankind. He is our first president of this Society, and I should like very much to hear from him as to his explorations in Europe.

Col. Robertson. Mr. President, I will not take your time with any remarks, but I may say here that I was requested by your Secretary to prepare a paper upon climatology and other kindred topics. I received his letter while traveling in Northern Europe, and was so occupied at the time that the matter was neglected. But the subject is one of great interest to me, and it will afford me great pleasure to prepare a short paper for publication on the topic of economic climatology for Minnesota.



SECRETARY'S ANNUAL REPORT.

Mr. President and Fellow Members :

I have the honor for the third time to present herewith my annual report. We are to be congratulated upon the most auspicious circumstances under which we meet as a Society on this our twenty-first anniversary. Some of the earnest band of workers in the horticultural field, who helped to do foundation work in Minnesota, are with us still to-day. That unanimity of purpose, as well as harmony of action, which in a marked degree have characterized all the Society's transactions in the past, are yet preserved; and notwithstanding obstacles that may perhaps have been encountered heretofore, there is abundant cause for satisfaction at the progress made.

Permit me here to add with that illustrious pomologist, the late Marshall P. Wilder, in his unique address before the American Pomological Society at Boston, in 1881, when he said: "Happy, most happy am I to join hands with some who aided in the establishment of our institution; who rocked the cradle of its infancy and still survive to rejoice in its progress and usefulness."

In looking back upon the record made in twenty years or more in horticultural work and progress in our North Star State, we find a wondrous field for study and reflection. Some most important lessons have been taught us in the past, from which we should glean wisdom for the future and seek to profit from the same in days to come.

COMMERCIAL HORTICULTURE.

It has been said, "It is no royal road that leads on to fortune;" and that is true, at least on horticultural grounds. In growing fruit there must be neither lack of perseverance, watchfulness nor care; and one must be prepared to overcome most serious obstacles, and only hope to be successful on legitimate lines, no matter how much zeal or skill may be expended when once the object sought to be attained is known to be impracticable and vain. It is unreasonable, for instance, to expect that Minnesota should compete successfully in raising fruit with California, that "horticultural paradise," as it is often called, at least in a commercial way. That state claims greater adapt-

ability to growing fruits of every kind than almost any other clime, and hence the industry is rapidly upon the increase; extravagant reports are given concerning average yields of fruit and prices realized.

RAPID TRANSIT.

One thing that should be borne in mind in this connection is the fact that, by the use of good refrigerator cars, these California fruits are readily transported and brought in competition with the products raised in other states and sections further east. As is well known, in Illinois, Michigan, and other fruit producing states some growers are becoming more or less alarmed at the enormous shipments being made, lest home-grown fruits should be displaced and local markets overstocked.

INCREASE OF SHIPMENTS.

It seems these fruits from the Pacific coast are finding ready sale. Our local dealers and commission men in Minneapolis and St. Paul, who first began a year or so ago to handle western fruits in bulk, received this season several hundred cars of California fruits. In view of these conditions the question seems to be presented what method should be used to meet this competition, what line of action ought to be pursued to bring about the best results for all concerned?

MEANS AND METHODS.

It generally is a waste of time and poor economy to try to grow that which will come in competition with products from more highly favored localities. The prudent farmer, fruit grower, and market gardener as well, will count the cost to see what he can raise to best advantage. Choice products generally command the highest price; and therefore it will always pay to raise the *very best*. Then, too, with thorough cultivation a better and larger yield will be secured.

By studying markets carefully, the nature of the climate, soil, exposure, cost of marketing, and the like, a better understanding can be had of what to grow and when and how to sell the product raised. Results will be more satisfactory by far than carrying on the enterprise, or industry pursued, in the old-fashioned, haphazard kind of style.

HOME GROWN FRUITS.

But after all that may be said in favor of commercial horticulture in

this State, our main dependence, or rather what is wanted most, it seems to us, is some awakening among the masses as to the importance of providing liberal supplies of home grown fruits.

We wish to emphasize this point. There is no wisdom in the farmer bending all his energies at raising wheat and totally neglecting the "plum thicket" and the strawberry "patch." In nine times out of ten the farmer who neglects to grow sufficient fruit for home and family use because it "costs" too much, will go without this almost priceless blessing, which surely is within the easy reach of all. The business of raising home grown fruits for family use should take a new momentum right away. While there is progress in some localities in this direction quite marked and most encouraging indeed, the industry should be increased a hundred-fold throughout the State.

There is good logic in the following in a recent issue of the *Farm, Stock and Home*: "Increase the gardens and small fruits of a country and you increase the comfort and happiness of its people."

THE PAST YEAR

In some respects has been unfavorable for fruit. The drouth had been severe in several western states the previous year, and being still protracted into 1887, results were quite disastrous to the farming interests of the State. The ravages of chinch bugs were more extensive and destructive than ever known before, especially to our leading staple, wheat. The ill effects of drouth were equally as marked, we think, on fruits as on the cereals and vegetable productions. One cause of shortage in our crop of fruits lies in the further fact that many of our orchards have not yet become restored from the effects of our late trying winter; some orchards being totally destroyed. In some localities, however, there was a gratifying show of fruit. The orchards yielding well were mainly those in favorable situations and the varieties produced were of the hardier kinds.

SMALL FRUITS.

The small fruit products of the State were greatly shortened by the drouth; but this deficiency was partly counterbalanced by excellence in quality of fruit produced. Strawberries ripened earlier than usual, and quite a number of our local growers reported satisfactory yields of fruit.

Grapes seldom ever have been known to be a better or a larger crop. The dry and heated spell of weather which prevailed so long proved

very beneficial, and all the leading sorts matured their crops of fruit.

In view of all the circumstances and conditions, the season averaged fairly well.

FRUIT AT THE STATE FAIR.

At our State Fair, held last September, there was a fine exhibit made of fruits, of apples, grapes and native plums. The fruit department was very properly conducted by or under the auspices of our Society.

The well known Duchess and our favorite Wealthy took the lead in kinds of apples shown. The Okabena seedling attracted much attention, as did the fine display made by our genial friend from Steele, who, by the way, secured the lion's share of premiums on the larger fruits.

The grapes exhibited were large and very fine, and numerous varieties were shown. Mr. Latham, our champion grower at Excelsior, was awarded first premium on Delaware, Concord, Moore's Early, Iona, Duchess, Roger's No. 4 and Telegraph; and second on the Janesville, Roger's No. 39, Lady, Brighton and ten best kinds for Minnesota.

Mr. Knapheide of Ramsey county, received first premium on the best ten varieties adapted to Minnesota. He made a fine display of seedling grapes. Some eight years since he sowed a quantity of mixed grape seed and obtained therefrom a number of quite promising varieties which have been bearing for some time, the fruit of which has not before been shown. No names have yet been given these varieties, they being known by numbers only. When fully tested and proven to be valuable, they will be given names. He states that No. 1 is not considered healthy, it being subject heretofore to mildew; No. 5, a small variety, slow grower, healthy, and a good bearer, is very early. Nos. 6 and 7 are healthy, prolific and good growers.

There were quite numerous entries made as well as premiums awarded, and the display in general was creditable indeed. Much praise is due the superintendent, our worthy President, for the attractive way in which exhibits were arranged to show their merits to the best advantage.

FRUIT AT ROCHESTER FAIR.

There also was a creditable exhibit made of fruit at Rochester, at the fair held by the Southern Minnesota Fair Association, it being mostly

shown by local growers thereabouts. Mr. Sias, of Rochester, exhibited some twenty kinds of evergreens. Mr. Somerville, of Viola, who exhibited some twenty-seven varieties of apples, and mostly of new Russian sorts, received the larger share of premiums awarded.

SOME STATISTICS.

Census reports give the value of orchard products in the United States as follows: 1850, \$7,723,186; 1860, \$19,991,885; 1870, \$47,335,189, (gold value about \$38,000,000); 1880, \$50,876,154. For the year 1886, apples, \$50,400,000; pears, \$14,130,000; peaches, \$56,135,000; grapes, \$2,118,900; strawberries, \$5,000,000; other fruits, \$10,432,800.

As indicating the importance of the fruit interest it may be stated that California alone has more than seventy-five thousand acres in vineyards. Seven thousand crates of strawberries, or ten thousand bushels have been received in the New York market in a single day. Between seven and eight million baskets of peaches were grown in Maryland and Delaware in 1875.

The progress made in fruit culture during the past twenty-five or thirty years has been marked indeed. The exports of apples from this country which were 269,000 barrels in 1861, sixteen years later were 2,937,025 barrels. Where a few years ago small plots of ground were occupied in this industry, we find hundreds of acres at the present time. But the demand has kept quite even pace with the supply, and the choicest fruits are no longer considered as luxuries merely but as articles of necessity within the easy reach of all.

The following statistics are given here, made up from reports of different counties in Minnesota to the Secretary of State:

Number of apple trees growing in 1886	474,258
Number of apple trees bearing in 1886	188,958
Number of bushels of apples grown in 1886.....	123,199
Number of apple trees growing in 1887	478,742
Number of apple trees bearing in 1887.....	160,926
Number of grape vines bearing in 1886.....	89,876
Number of pounds grapes produced in 1886.....	206,200
Number of grape vines in bearing in 1887.....	87,171
Number of forest trees planted in 1887 on Arbor day.....	327,130
Number of acres planted during season	3,220
Number of rods planted on highways and farms in 1887	522,837
Number of acres forest trees growing in State.....	47,431

Without commenting here at length on these statistics it may be

proper to observe, that while somewhat indefinite or unsatisfactory in some respects, they indicate some progress being made—that work is going on to some extent at least throughout the State. Of course if full and accurate returns could be obtained there would be still a larger and better showing given.

THE SOCIETY.

The progress made by the Society in 1887 is quite encouraging indeed. Our annual membership, in view of stringency in money matters, and the low prices which obtain in farm produce of every kind is well maintained. We have to-day a considerably larger list of active paying members than several other horticultural societies that might be named in other sister states. We do not say this boastingly but as indicative of interest felt in Minnesota in the advancement of the cause we seek to foster and promote.

A live society exerts a potent influence at home as well as abroad. The facts and information elicited by the discussions and proceedings at our annual gatherings, when spread upon our minutes and placed before the public in a permanent form, are found to be of special value in awakening interest in horticultural matters generally throughout the State, as well as elsewhere in a greater or less degree. We ought to strive of course to raise our standards higher year by year; to gain such facts concerning best and hardiest varieties as may prove valuable to all.

It is most gratifying to observe the great demand, especially on the part of the farming community, for our published transactions; the care with which the same are read and well preserved upon their library shelves. It should be stated here there is a marked demand of late from other states for our reports from many leading publishers, as well as from the managers of educational institutions throughout the land.

PUBLISHING REPORTS.

At our last annual meeting a change was recommended in the law regarding the publication of our reports, to increase the number of the same to five thousand copies, of which number two thousand copies should be bound in cloth. Accordingly a bill was introduced by Senator Hoard containing such provisions, similar to the present law in force, which promptly passed the senate but was not reached in time for final passage through the house.

Our present number of reports, three thousand five hundred copies,

if carefully and properly distributed, is quite inadequate to meet the wants of the Society. There should be some provision for binding them in cloth. The books in paper covers are apt to go the way suggested by Secretary Gibbs in his report for 1884: "The usual way of pamphlets; first down flat on shelves around the house, dust covered, disarranged and always in the way; then up garret, and finally to the rag gatherer for a tin whistle, and when wanted for reference to help out in a difficulty in the garden or orchard, never found."

The bill referred to failing to become a law an order was obtained from Col. Mattson, secretary of state, for six hundred copies to be bound in cloth, and with three hundred copies bound at the expense of the Society, by using some economy we have done fairly well. Of course discretion must be exercised in sending out reports, as it is necessary to retain a certain quantity for future use.

VOLUME FIFTEEN.

The last volume of our transactions was issued in the month of May or nearly two months earlier than the preceding year. It was a trifle larger than previous numbers and lacked but a single page of the number limited by law,—499. The typographical work was well performed, thanks to the pains-taking publishers, the Pioneer Press Printing Company, and makes a creditable appearance, especially the copies bound in cloth.

PERSONAL NOTICES.

Among the many notices received we quote the following:

CHAMPAIGN, ILL., May 14, 1887.

S. D. Hillman, Secretary, etc.:

Please accept my cordial thanks for your kindness in sending me a copy of your excellent report. I have looked it through with much interest, and am glad to see that in Minnesota as in Michigan, Illinois and many other states the science of horticulture is progressing.

Very truly yours,

CLARENCE M. WEED.

COLUMBUS HORTICULTURAL SOCIETY,

COLUMBUS, O., May 16, 1887.

S. D. Hillman, Secretary, etc.:

DEAR SIR: Copy of your report for 1887 at hand, for which accept thanks. I think you must have a live Society, from the amount of

work you are doing and the voluminous report you send out. So far as I have examined it, I find it good.

Can you not exchange with our society?

Yours truly,

H. S. DEVOL, *Secretary.*

DALLAS, TEXAS, June 1, 1887.

S. D. Hillman, Secretary, etc.:

Copy of Minnesota State Horticultural Society's report received. Please accept thanks and hearty congratulations from the Texas State Horticultural Society. We have live material in our society trying to do effective work, and we hope to be able to send you our published report ere very long.

Yours for horticultural progress,

MRS. J. R. JOHNSON,

Secy. Texas State Hort. Society.

OFFICE OF SECRETARY, INDIANA HORTICULTURAL SOCIETY,
BRIDGEPORT, IND., June 29, 1887.

S. D. Hillman, Secretary, etc.:

Your valuable report at hand. I have looked through it, and find it full of meat. I see you are making the tree peddlers' road a hard one to travel. That is right; he should be suppressed, or made to do an honest business.

The late spring frosts damaged our larger fruits badly. The continued dry weather is seriously affecting raspberries and blackberries. This will be the lightest fruit crop for several years.

Yours truly,

C. M. HOBBS.

KINGSTON, ILL., May 23, 1887.

S. D. Hillman, Secretary, etc.:

I am in receipt of report of Minnesota State Horticultural Society for 1887, which you had the kindness to send me. Please accept my sincere thanks for same. I think your reports are of real value to all horticulturists, but especially so to those who are just starting in the business.

With best wishes for your Society, I remain

Respectfully yours,

JACOB HECKMAN.

EDITORIAL NOTICES.

The fifteenth annual report of this wide-awake and efficient organization is received, through the kindness of its accomplished Secretary, S. D. Hillman, Esq., of Minneapolis. In its number of pages (499) it is the largest, and in its contents certainly not below the best of the series, the possession of which has added much to the practical usefulness of our collection of horticultural and agricultural reports, which now covers those of most of the states and provinces issuing them. Secretary Hillman is aware of the importance of a good index, and that of this volume covers thirteen pages. The horticulture—especially the tree-fruit culture—of Minnesota is of great interest to the residents of the older portions of New England. From Minnesota we received the noble Wealthy apple, which has given greater impetus and hope to our orcharding than any previous accession. There is a good prospect that from the same source we shall get other equally good, and perhaps in some respect—such as long keeping—even better varieties. Two very fine Minnesota seedling apples, the Rollins Pippin and Giant Swaar, have done well with us; and Mr. Gideon, author of the Wealthy, is putting out a number of additional seedlings for trial, that are promising.—*Dr. T. H. Hoskins in Rural Vermonter.*

The annual report of the Minnesota Horticultural Society for the year 1887 is a handsome volume of five hundred pages, embracing transactions of the Society, proceedings of the Amber Cane Association, essays, reports, etc., which are of exceeding great value to those owning a farm or garden.—*Hastings Gazette.*

The annual report of the Minnesota Horticultural Society for 1887, just received, is a volume of 500 pages. It contains the transactions of the Society from March 31, 1886, to March 31, 1887; also the proceedings of the annual meeting of the Minnesota Amber Cane Association, several essays on horticulture and kindred topics, reports of committees and directors of experiment stations, reports of local societies, and of delegates to Wisconsin, Dakota, and elsewhere, and the secretary's portfolio, which contains gleanings from various horticultural sources, a feature which may well be considerably extended in future reports. The report also contains the horticultural enactments of the recent legislature, letters from distinguished horticulturists in other states, list of officers and members, etc. We do not know how large an edition of this book has been printed, but we wish a

copy could be placed in the hands of every farmer in the State.—*The Farmer, St. Paul.*

The fifteenth annual report of the Minnesota Horticultural Society makes a comprehensive volume of 500 pages, containing the essays, discussions, fruit reports and proceedings of the Society for the past year to which is added a report of the Amber Cane Association and reports from delegates to other societies. The book is beautifully edited by the secretary, S. D. Hillman of Minneapolis, upon whom it reflects great credit. The Society is supported by an annual appropriation of \$1,000 from the State, which also prints its reports. Its report is a model. It describes a horticulture entirely new to the great fruit growing sections of the country, for the cold north requires different varieties and treatment from those common to other sections. Every horticulturist north of 42° of latitude and west of the 8th meridian should procure and consult the practical experiences of the successful horticulturists of the Northwest, so well presented in this carefully edited volume.—*Farm and Home.*

We are in receipt of a copy of the annual report of the Minnesota Horticultural Society for 1887. It embraces the transactions of the Society from March 31, 1886, to March 31, 1887, also proceedings of the annual meeting of the Minnesota Amber Cane Association, essays, reports, etc. It is a good work for reference, and a copy should be in the hands of every amateur horticulturist in the State. *Dodge County Republican.*

The annual report of the Minnesota State Horticultural Society for 1886-7 is a volume of 500 pages. It contains the proceedings of the Society for the year, and contains many reports and papers of value and interest on matters of horticulture in its various branches. It is a matter of regret that, so far as we have examined, there is neither a name nor a line in the whole report that would lead us to believe there was such a county as Fillmore in the State of Minnesota. Mr. J. S. Harris of LaCrescent, Houston county, is a prominent member of the society and participant in its proceedings. Besides a report of the proceedings of the Wisconsin State Horticultural Society, where he was a delegate, and a report on seedling fruits, Mr. Harris presented four papers: "Small Fruits for Market and Home Use," "Propagating by Grafting, Budding and Layering," (illustrated), "The Codling Moth," "Fruit Growing in the Northwest," also two reports on fruit in Houston county. These papers fill sixty pages of the annual report.—*Lanesboro Journal, June 3, 1887.*

SELLING NURSERY STOCK.

Considerable discussion was had at our last annual meeting concerning fraudulent practices of itinerant tree agents and commission men. As a result thereof a committee of five was chosen, as you remember, to recommend some proper action to be taken in the matter, and they reported in favor of the passage of a law for the better protection of the public against frauds and willful misrepresentations in the sale of foreign nursery stock.

The Society adopted this report, and a bill was drafted which, with some amendments, became a law. Of course the passage of the bill was bitterly opposed by some—"No rogue e'er felt the halter draw with good opinion of the law." The "unconstitutionality" of the measure was strongly urged; but, after some delay, the senate passed the bill without a single dissenting vote, and later it passed through the house.

While there is some diversity of views among nurserymen and horticulturists in general upon this subject, a majority seem in favor of giving the law a trial. The subject is a most important one, in some respects at least, and is deserving of most careful thought and due consideration.

H. E. Van Deman, chief of the division of pomology, Washington, D. C., under date of Feb. 12, 1887, writes: "Your action regarding the protection of your people against tree swindlers is entirely in accord with my mind. I noticed a rather suppressed report (as I supposed) of the discussion in the papers. It would be an effectual cure of many of these ills if a state law can be passed which makes it a penal offense to misrepresent the stock sold, and impose a license on the agents. Shall be glad to get a copy of the pending bill."

President J. M. Smith, of the Wisconsin Horticultural Society, who attended our annual meeting one year ago, was quite pronounced in his expression of opinion on this subject. In his address before the Wisconsin society in February last he says: "Last month, while attending the convention of the Minnesota State Society, the question of the fraudulent sales of fruit trees, plants, shrubs and ornamental plants came up, and was pretty thoroughly discussed." After referring briefly to the action taken, he thus concludes: "It does seem to me that some effort should be made to protect our citizens from this class of downright swindlers, for to me they seem to be that and nothing else."

Upon the other hand, some indignation was evinced by certain nur-

serymen, or agents, that such a law should be enacted here in Minnesota. At an informal meeting in Chicago, the latter part of June, preliminary steps were taken to test the constitutionality of the law, and over twenty different firms united in a pledge to share in the expense of bringing a test case, agreeing to use their influence, as therein expressed, "to defend what we consider to be the right of every nurseryman, namely, the right to equal business privileges."

However, for reasons best known to themselves, the project was not carried out. A better and more rational view perhaps was taken, that it would be the wisest plan to cheerfully comply with the provisions of the law.

We are informed by Col. Mattson, the Secretary of State, that numerous firms have filed the bonds required, and that so far as he can learn the law is working well. He states where parties understand the object of the law there seems to be no disposition to evade it, and he ventures the opinion that the law will prove effectual in the correction of the evils sought to be repressed, and in its moral influence, at least, will be productive of much good.

Another year we may be able to determine better than at present as to results to be accomplished by the law, and as to whether it should be amended, or peradventure be repealed.

MR. T. T. LYON.

During this last fall we had the pleasure of forming the acquaintance of T. T. Lyon, president of the Michigan State Horticultural Society, and of receiving a visit from him on the occasion of his western tour. He is a prominent fruit grower of that state, and has long been identified with horticultural organization in his own and other states, taking a lively and active interest in horticultural matters in general. He has recently prepared a valuable history of Michigan horticulture for publication by the society of that state. While here, Mr. Lyon accompanied us to the experimental farm, and seemed much interested in the operations being conducted there under the direction of the superintendent, Prof. Porter, and more especially with regard to experiments being made with Russian varieties, methods pursued in making tests, etc.

Mr. Lyon, although quite advanced in years, appears yet hale and hearty, and his step is firm and elastic. On meeting him one cannot fail to admire his quiet and unobtrusive manners, nor to profit from his extensive experience in horticultural affairs. He spent but a

few days in the State, but visited, we learn, a number of points of interest, returning home by way of Iowa, and going thence to Boston to attend the meeting of the American Pomological Society, at Boston, of which he was made vice-president. An excellent letter from him appears elsewhere.

FORESTRY.

We may be pardoned for referring to the forestry problem at some length, because of the importance of the subject and the awakening interest of late throughout the country in general with reference thereto.

Secretary Chas. W. Garfield, of Michigan, who is good authority on this subject, says: "Sweeping timber from our country is fast bringing about conditions which will render wheat growing unprofitable. What then?"

The importance of the preservation of timber, in its relation to agriculture, has engaged the attention of many intelligent farmers, and scientists as well. The national government has established its forestry division; New York, New Hampshire, Colorado and California have forestry commissions, and Ohio has its state forestry bureau.

OBJECTS TO BE SECURED.

Adolph Leue, the efficient secretary of the Ohio forestry bureau, in discussing the subject, says: "The forestry problem briefly stated is: To perpetually keep a certain percentage of the superficial area of our country in forests properly distributed, and to use and husband this in a manner that its usefulness be unimpaired.

"Forests serve, first, to ameliorate the climate by sheltering the ground, keeping it warm in winter and cool in summer; second, to regulate in a certain degree the water supply of our streams; third, to shelter our fields, our farm animals and our homes against the winds of winter; fourth, to furnish material for our various industries."

In addition to these objects there are numerous other considerations, such as the pleasing effect of woodlands, affording agreeable shade, the healthful influence of forests and groves, the protection to insectivorous birds, etc.

TIMBER AREA.

According to the census reports, there were about three hundred and eighty million acres of woodland in the United States in 1870, or

about twenty-five per cent of its entire area. The percentage in Minnesota was given as twenty and six-hundredths.

Secretary B. E. Fernow, of the forestry division of the agricultural department at Washington, in his annual report for 1886, presents some interesting facts concerning the significance of forests, their climatic influence, etc. He says:

"It is generally recognized that forests have always been important factors in the national life, the civilization and progress of the human race."

With reference to the climatic influence of forests, he states that "forests act like large sheets of water as a starting point for diverging winds. While the forest may not positively cause rain to fall, yet it does not at least prevent it, as the heated bare ground or field often does. The forest is a regulator of climatic, as it is of hydrologic extremes."

He gives a comparative table showing the farming interest in forestry property of the United States, which it is estimated comprises some thirty-eight per cent of the total area. The timbered area of Minnesota is thirty million acres, as compared with seventeen millions for Wisconsin, fourteen millions for Michigan, a trifle short of three million acres each in Iowa and Dakota, a million and a half acres in Nebraska, and three and one-half million acres in Kansas. From the statement referred to it appears that Minnesota is better supplied with forests than any other state in the union, certainly a most gratifying exhibit.

But while there seems to be an abundance of timber in Minnesota, in other portions of the western agricultural, prairie and mountain regions it appears to be decidedly deficient. Hence the imperative necessity of forestry preservation and improvement on the part of farmers and others.

MINNESOTA FORESTS.

Minnesota is the eighth state in the Union in the importance of lumber manufacturing interests. The principal centers of manufacture are Minneapolis and Anoka on the Mississippi river, Stillwater, Washington county, on the St. Croix, and Duluth, near the mouth of the St. Louis river.

Mr. Putnam in his report on the forests of this State says: "The great hardwood forests of Minnesota lie to the south and west of the pine forests, extending north and northwest from Freeborn and Murray counties into Marshall county, to within fifty or sixty miles of the

boundary line between Canada and the United States. This body of hardwood, which is some 300 miles long by some twenty miles wide, borders upon the prairies, and is the extreme western body of timber of any commercial value east of the Rocky Mountains. The surface of the land is level or gently undulating, well watered, particularly the so-called 'Park Region,' which lies in Becker, Otter Tail, Douglas, Stearns and Todd counties, and in fact extending through Wright, Hennepin, Carver, Le Sueur, Rice and Steele counties."

He describes our pine forests as "extending northwesterly through the counties of Chisago, Isanti, Mille Lacs, Benton, Morrison, Todd, Otter Tail, Becker, Polk and Beltrami, nearly parallel to the line of the hardwood forests, and crossing Red Lake River, extending to the north of Red Lake, thence easterly to the shore of Lake Superior at Grand Portage."

By the census of 1880 the white pine in Minnesota was estimated to be 8,170,000,000 feet, board measure. A little over one-third of this quantity was located on the Mississippi and its tributaries. In the belt of hardwood, extending west and south of the pine region, consisting of white, red and burr oak, sugar maple, poplar, etc., it was estimated there were 3,840,000 acres of timber remaining, capable of yielding an average of fifteen cords of wood per acre, or 57,600,000 cords. The amount of timber cut per year, exclusive of staves and headings, was estimated at 36,884,000 feet.

FORESTRY IN EUROPE.

The causes of the destruction of forests have been the same in the old world as in the new. The greed of men, the desire of speedy gain without reference to consequences, the want of judgment and knowledge as to cause and effect in the courses of nature and its developments, have razed and shorn the forests along the spurs of the Alps and the shores of the Mediterranean with the same merciless energy which has been displayed in this direction along the shores of American rivers and on the slopes of American mountains. As a result of this process large areas of the shore provinces of Austria-Hungary are now almost an arid desert. There is little timber in Dalmatia and Istria and the territory near Trieste. The dearth of timber is so pronounced that the region has been denominated "The Karst," which in common acceptance is almost synonymous with "Sahara."

It is stated that some four hundred and fifty years before the Christian era these woods furnished the material for Roman castles, houses and ships.

The result of this deforestation in a climatic direction has been highly disastrous. The same region which had been famous for its mild and temperate climate has become changeable and unreliable; landslides and avalanches have come and gone, mountain creeks have become dry, and the whole face of the country has been changed from a rich, fruitful and salubrious climate to one arid, sterile plain, interspersed with stony and parched hillsides, populated by meagre sheep and goats and their equally meagre owners.

The work of reclaiming these forest areas is performed under the supervision and the direct advice and control of forest officers, who are paid by the government.

In southeastern France, where the gradual destruction of forests has been pursued for centuries past, the soil of thousands of acres of high pasture land has been washed away by violent vernal and autumnal rains, and sudden floods and violent winds which have prevailed have destroyed large areas of forests. The consequence has been highly disastrous in all that mountainous region. The barren hills have been seamed by rugged chasms and gullies, and the fertile valleys below have been devastated with floods of a turbulent and destructive nature.

To resist this process of destruction the French government began some seventy years ago a system of forest supervision, followed later by the replanting of trees, and under the system employing a large corps of officers and men. Up to 1879 about 250,000 acres of practically waste land had been reclaimed at an annual expense to the state for a period of nineteen years of about \$500,000.

In Germany the destruction of forests has been very notable. It is stated that "many countries which flourished in former times have, by devastation or extermination of their forests, fallen into pauperism and cultured decrepitude." Neheuagen, from the destruction of forests in the seventeenth and eighteenth centuries, became a desert. Moveable sand now covers vast fertile tracts in adjacent districts. Villages, where the farming population lived in prosperity, have disappeared or fallen into ruins.

In northern Hanover there are deserts subject to violent hurricanes, which with other causes prove an obstruction to all efforts to prepare the land for cultivation or to renew foresting.

In other localities equally appalling results are observed from the despoiling process.

THE AMERICAN FORESTRY CONGRESS.

At the sixth annual meeting of the American Forestry Congress, held at Springfield, Ill., last September, it was stated that the combined forests of the Northwest are being cut at the rate of 800,000,000 feet per year. At this rate of deforestation it is estimated that within fifteen to twenty years the great pine forests of Minnesota, Michigan and Wisconsin will be obliterated as an article of commerce.

It was there suggested that, if these forests were to be destroyed, "the great rivers of the Northwest would in the dry season become less than the babbling brooks instead of the commercial waterways as they are now."

Col. Robertson, of St. Paul, who attended the meeting above referred to, read an interesting paper on climatology, etc. You have also heard from him in person at this meeting on this and kindred topics.

Mr. Newlon, of Kansas, read an interesting paper on "Helps and hindrances to Kansas forestry." He stated that the farmers of that state had done much in the way of grove and tree planting on their farms and around their orchards. These efforts were already affording a rich return. All that was needed in the future was intelligent discussion and agitation to stimulate in the minds of the masses an inspiration for forestry. Among the "hindrances" were mentioned the great drouths, fires, birds and insects; also the cutting of timber as rapidly as it grew. The slaughter of the birds was particularly deplored.

The reports as to forestry in Nebraska were of an interesting nature. There is awakened interest among the people on the subject, and efforts are there made to interest the children of the public schools.

Among the measures recommended by the meeting was the passage of a bill in Congress for the protection and administration of the forests of the public domain. The bill provides for the designation of public forest lands to be owned and controlled by the United States; withdrawal of such lands from sale, to prevent entries upon public lands; for a commissioner of forests; the establishment of forest reserves; imposing penalty for timber cutting; and appropriating five hundred thousand dollars to carry out the provisions of the act.

Prof. J. L. Budd, of Iowa, read an interesting paper entitled "Possible modification of our prairie climate," in which he states: "We

are anxious to impress the fact that successful orcharding, small fruit growing, and crop production in field and garden, depend more on extremes of rainfall, temperature and atmospheric humidity than on monthly or longer periodic means."

Prof. Budd further says: "Facts too evident for successful refutation lead us to believe that the tendency to extremes of drouth will become still more manifest as the prairies become more generally occupied and cultivated, unless the evils we have brought about be not mitigated or perhaps wholly removed by planting a due proportion of the country with forest trees."

STATE AGRICULTURAL SOCIETY.

January 10th the meeting of the State Agricultural Society was held at St. Paul, for the transaction of business connected with that society. There are, it seems to us, some figures presented by the report of the treasurer that are of more than passing interest. The receipts from the fair, held in September, from tickets sold, entrance money and privileges, was the sum of \$72,303.52. The annual appropriation was \$4,000; other receipts make the grand total \$79,303.98.

Of the disbursements the largest items were: Premiums and awards, \$9,881.64; race purses, \$15,135; special attractions, \$13,438.75. The net profits of the fair were something over \$18,000. The amount of premiums awarded in the horticultural department was as follows: Fruits, apples, \$167; grapes, \$125; small fruits, \$60; flowers, \$188; vegetables (including county societies), \$559; culinary and domestic department, \$312; total, \$1,225.

In addition to the amount of receipts above noted the sum of \$25,000 was received from the State, being one-half the special appropriation in aid of the society. The report shows a balance of something over four thousand dollars in the hands of the treasurer, after paying certain items of indebtedness for improvements made, expense of fair, etc.

The value of the fair ground property, including two hundred acres, estimated at \$200 per acre; main building, \$24,000; grand stand, \$21,000; nineteen stock barns and stables, \$35,500; other buildings and sheds about \$60,000, and including the sum of \$25,000 due from the State, with certain other minor items mentioned in report, give a grand total of \$597,131 92.

A detailed report of the transactions of the Agricultural Society, including statements as to receipts and disbursements made, premi-

ums awarded, etc., etc., will be made by the efficient secretary of the society, Hon. H. E. Hoard. This is the first time in the history of that organization, during an existence of about thirty years, that a detailed report has been furnished for publication in permanent form. This exhibit is one which should reflect credit upon the people of not only this State in general, but upon the able management of the board of agriculture of Minnesota. For further information on this subject we commend our members and others interested to the report of Secretary Hoard.

EXPERIMENTAL WORK.

We wish to call attention briefly to what is being done on experimental lines for the promotion of horticultural progress in the State. It is well known that this important field of work has been too much neglected; that while we have a goodly number who are thoroughly in earnest and doing valient service, and who are making steady progress in this important field, still it is found to be impracticable for this Society to render its material assistance. We haven't the authority or power to use our funds in that direction. Hence the experiments which have been carried on have been conducted almost wholly by individual enterprise.

The obstacles which have been met in this direction have been of such a nature as to preclude the power for rapid or substantial progress being made. Too many have been heard to say "it costs too much" to make experiments; adding that the money will be "wasted," or the results will prove a "failure."

But these short-sighted individuals are far behind the times. They fail to recognize the spirit of the age in which we live when "progress" seems to be the watchword everywhere. They do not seem to catch the inspiration of advancements being made in every field of thought as well as every line of work. Says Mr. Wilder, in his address elsewhere alluded to: "Although we may not be able to prescribe the exact limits to which improvement may be extended, we know that upon the subtle forces of hybridization, either accidentally or by the hand of man, we must ever depend for the improvement of our fruits."

He further says: "From the sour crab, the puckery pear, the bitter almond and the austere plum, came the tender, spicy apple, the melting juicy pear, the velvet lucious peach, the delicious purple or golden plum; and from our rank and foxy grape came the splendid varieties which now adorn our tables and 'make glad the heart of man.'"

We point with pleasure to reports elsewhere presented by several of our earnest workers who are conducting practical experiments on horticultural lines. We trust their efforts will be much enlarged upon and be extended in the future. Since the appropriation made by the Hatch Experiment Station law has now become available, we hope the members of this Society will render every assistance in their power for carrying forward this worthy enterprise.

We had desired to mention briefly some other matters of passing interest, but lack of time and space forbid. We beg indulgence for this imperfect and very hastily prepared report; and in sincerest thankfulness, returning many kindly words and favors shown your Secretary in the past, we bid you in the worthy cause you represent, a truly hearty Godspeed.

FINANCIAL REPORT OF SECRETARY.

The following is a statement of receipts and disbursements by the Secretary for the year ending Jan. 16, 1888, as shown by itemized statement submitted:

RECEIPTS.

Membership fees for 1886-7.....	\$46 50
Membership fees for 1888-9.....	16 00
Amount to balance	8 95
Total.....	\$71 45

DISBURSEMENTS.

Railroad fare and entertainment paid.....	\$19 85
Cuts and engravings	9 30
Postage stamps, cards and wrappers.....	18 80
Expressage.....	19 35
Printing and stationery	22 15
Total.....	\$71 45

Respectfully submitted,

S. D. HILLMAN,

Secretary.

TREASURER'S ANNUAL REPORT.

To the President and Secretary of the Minnesota State Horticultural Society:

As Treasurer of the Minnesota State Horticultural Society, I submit the following statement of receipts and disbursements of the Society from Jan. 20 to Dec 5, 1887, inclusive:

RECEIPTS.

1887.		
Jan. 20.	Contingent fund on hand last settlement	\$809 47
April 1.	Premiums awarded at New Orleans Exposition	50 00
July 6.	State Treasurer, one-half annual appropriation for 1887.....	500 00
Sept. 14.	Andrew Peterson, membership fee, 1887	1 00
Total receipts		\$1,360 47

The following disbursements have been made, as shown by vouchers herewith returned:

DISBURSEMENTS.

1887.		
Jan. 22.	A. W. Sias, vice president, expenses, winter meeting.....	\$5 00
	M. Cutler, vice president, railroad fare.....	1 50
	E. A. Cuzner, expressage, etc....	3 25
	J. M. Smith, expenses, by request of Society.....	12 00
	Premiums paid at the Winter Meeting.....	79 00
25.	Donaldson & Ogden, plates, per Brimhall....	2 28
Feb. 1.	Pioneer Press, 5,000 copies President Northrop's address....	50 00
Feb. 22.	J. S. Harris, expenses as delegate to Wisconsin.....	12 00
April 1.	S. D. Hillman, first quarter's salary.....	125 00
July 1.	S. D. Hillman, second quarter's salary.....	125 00
	Pioneer Press Co., binding reports and wrappers	106 00
28.	S. D. Hillman, postage on reports, 1887.....	120 00
Aug. 5.	A. W. Sias, expenses on Seedling Committee.....	25 00
	J. S. Harris, expenses on Seedling Committee.....	35 04
Oct. 6.	S. D. Hillman, third quarter's salary.....	125 00
Dec. 1.	J. T. Grimes, incidental expenses.....	2 10
5.	J. T. Grimes, salary to date.....	21 88
Total expenditures.....		\$850 05
Balance in Treasurer's hands.....		\$510 42
		\$1,360 47

The contingent fund of 1885 was \$882.40; from which has been taken for the year 1886, \$72 93; and for 1887, \$358.47.

There is due to the Society from State appropriation for current year, \$500.
No report has been made to me by the Secretary of membership fees.

All of which is respectfully submitted,

J. T. GRIMES,
Treasurer.

The reports of the treasurer and the financial report of the secretary were referred to the Finance Committee, composed of members of the Executive Committee.

Mr. Harris, chairman of the committee, presented a report subsequently that the committee had examined the accounts and the same were correct and duly approved.

RESIGNATION OF TREASURER GRIMES.

To Wyman Elliot, President of the Minnesota State Horticultural Society :

Having made arrangements to be away during the winter, so that I will not be able to attend to the duties of the office which I now hold under the direction of the Society, I herewith respectfully tender my resignation to take effect Dec. 5, 1887. A statement of the finances, with the books and vouchers, will be placed in the hands of the Secretary. If there should be any errors they will be promptly and cheerfully corrected.

With my best wishes for the interests and welfare of the Society, I remain, truly,

J. T. GRIMES,
Treasurer.

P. S.—My report shows that there is in my hands \$510.42, which I will hand to you.

J. T. G.

LIBRARIAN'S REPORT.

The number of reports in storage at the agriculture building of the State University at Minneapolis, Jan. 17, 1888: 1886-73, cloth, 208; 1874, paper, 398; 1875, paper, 68; 1876, paper, 693; 1877, paper, 367; 1878, paper, 144; cloth, 32; 1879, paper 7; cloth, 3; 1880, paper, —; cloth, 90; 1881, paper, 1,250; cloth, 206; 1882, paper, 1,744; cloth, 587; 1883, paper, 338; cloth, 987; 1884, paper, 750; cloth, 512; 1885, paper 140; cloth, 3; 1886, paper, 672; cloth 154; 1887, paper, 372; cloth, 78.

Two complete sets were sent to St. Paul and one hundred and sixty-eight volumes, comprising sets in part, were distributed as advised by the Secretary.

E. A. CUZNER,
Librarian.

Mr. Fuller. Mr. President, I see by the report just read that some money was received by the Society from New Orleans. I should like to ask if there has ever been any report made as to the manner in which the money appropriated was expended there. I see the governor of Michigan has been compelled to make a report of the expenditure of money used for that purpose; and the question has arisen in my own mind whether any report has been made as to the money appropriated from this State?

President Elliot. Personally I could not answer, but I think Prof. Porter could give some information, perhaps, upon that subject.

Prof. Porter. Is Mr. Gibbs here? If he was here he could give you a good deal more information than I can. He was commissioner from our State. I was acting commissioner for six weeks while he was at Washington. We not only had no money to meet all the expenses of the State, but we had none to get the exhibits back home and distribute them among those gentlemen who had made contributions. Personally, I devoted a year of time to that work. I never received one dollar from the beginning to the end for my services. Not only so, I paid a great many dollars out of my own pocket to get our exhibits back home and distribute them to exhibitors throughout the State; all of which is charged up to profit and loss.

A detailed report would have been made had there been any funds to defray the expense of publication. Gov. Hubbard, in order to meet the expense of making an exhibit that should be of credit to the State, was obliged to draw from his contingent fund every dollar that he could possibly spare in order to close up in a proper manner. And therefore nothing was left at that time to publish reports.

The plan that was adopted by Commissioner Gibbs for the publication of that report did not meet my approval entirely. He advised that the report should be made by the commissioner. I understand he lays some blame upon Mr. Marvin, who was in charge of the dairy exhibit, and myself, because we haven't made a detailed report to him. I rendered a report of my department as commissioner of agriculture some eighteen months ago, perhaps; I did not render a report as chief

of installation, because I had my hands about four times more than full of routine work, and I had spent a good deal of time already, you know, for the State at New Orleans; and I didn't intend to do any more work "free, gratis, for nothing," and pay my own expenses.

Mr. Fuller. I am glad to hear this statement, because it is a matter of which I know nothing, and inquiries have been made.

Prof. Porter. This report will be published, as that is the intention of both Gov. McGill and Gov. Hubbard. It is understood the report will now be made; the required funds will be furnished by private parties, or from the contingent fund of the State, or from an appropriation by the legislature. It is right and proper that a report of that exhibit should be made. It was the best state exhibit made at the Exposition at New Orleans; our State was the best represented there. The \$30,000 expended by the State should be properly accounted for. It has not been done heretofore only from lack of funds. The officers of the State have desired the report to be made. The State had money enough, but it could only be drawn according to law. I have just learned from Col. Young that the report is prepared and is now in the governor's office.

The following paper was then read:

THE CULTURE OF SMALL FRUITS. •

By Wm. Danforth, Red Wing.

That the cultivation of small fruits should be so generally neglected by people who live in the country, is a fact for which it is difficult to account, especially in a land so peculiarly adapted to their growth as this. A large portion of our people in this State of Minnesota neglect not only the cultivation of small fruits, but even the vegetable garden. You may possibly find a few beets, onions and cabbages; but no Lima beans, celery or cauliflower. You may occasionally find a few strawberries in some out of the way place, or some neglected raspberries in a fence corner, to be out of the way of the plow or team, grown up with grass and weeds—stalks mostly dead. Few people would turn away from a dish of ripe, plump strawberries powdered with sugar, or from a plate of melting raspberries and cream, but farmers think this luxury is not for them.

I can look back to the time, when a boy, I watched for the first wild strawberries of the season, to get the first ones for my mother, and traveled along the hedges and stone wall for the earliest raspberries, and how highly I prized the small area that was given me to set

a few cherry and plum trees, and a few peach trees. I know I trespassed, and took more ground than was allotted me.

The success of growing small fruit here depends mostly upon the location, the soil, and the man himself. I find our sandy loam adapted to all varieties of strawberries that we can grow so far, with fair results. We like top dressing the grass land, making it as productive as possible for grass. Then for setting plants the next spring, use what fertilizers you have—there is nothing better than stable manure. Do not be sparing, as the richer the soil is the more abundant crop may be expected. Plow deep as soon as possible after the grass is cut. In the spring plow again, and have the soil well pulverized. Mark off in rows three and one-half feet apart, and set the plants from fourteen to twenty inches in the row, according to variety—fourteen inches for Wilson, eighteen to twenty for Crescent. The latter is a pistillate variety, and the rows should be alternated with some variety that is perfect flowering.

I have raised many varieties, and consider the Wilson, Crescent, Charles Downing, Glendale and Manchester all good.

Care should be taken that the plants are protected from the sun, and the roots kept moist after being taken up till they are put in the ground. One man may take up plants, and others trim them and set as soon as possible. A dibble of good size for making the holes is convenient. Spread the roots, fill in with earth, pressing it firmly about them. Have the crown of the plant just even with the surface of the ground. They need now to be thoroughly watered. Before any weeds are seen the cultivator should be started, working as near rows as possible, stirring the ground but not throwing any earth toward the plants. Continue using the cultivator every ten days or two weeks, through the season, also hoe the plants every two or three weeks. We do not expect fruit the first summer, therefore take off all fruit buds as soon as they appear. In the fall a good dressing of ashes is beneficial. I have used three hundred bushels to the acre with good results. As soon as the ground is frozen cover the field with straw, cornstalks or leaves. The next spring but little need be done except to rake the mulch from the plants, and leave between the rows. After the fruit is gathered, if any weeds are grown, mow them, and if the ground is not well mulched put more on, and then set the fire and burn the field over. If the burning is not too severe, you will find no bad results, and but little labor to secure another crop.

The raspberry may be planted in fall or spring. I prefer early fall

planting, having the rows six feet apart, and the plants in the row four feet. We have the Doolittle, Mammoth Cluster, and Gregg for black; the Turner, Philadelphia, and Cuthbert for red. We cover the Cuthbert and Gregg with earth and mulch all kinds heavily. All large bushes need supporting by stake or wire. We trim as we find time through the summer. Suckers should be treated as weeds unless plants are wanted. The thorough mulching helps keep down weeds and ensures a crop if the season is dry.

For blackberries I make the rows seven feet apart, and plants four feet in the row. I have the Ancient Briton, Snyder, and Lawton. The Lawton with protection is a good bearer. The Snyder has not done well—seems hardy but does not yield much fruit. The Ancient Briton I consider a profitable variety if rightly managed. It must be laid down and covered with earth; and all kinds require to be supported with stakes, or stakes and wires. Our rows are mostly north and south. I have no choice of the points of compass. I find the stalks soon come up straight after being taken up.

To raise currants, work the soil, enrich and thoroughly mulch. In the fall cut out all old wood and leave seven or eight thrifty stalks.

I think small fruit pays richly in the family. Beginning with strawberries in the early part of June, one can have a succession till the frost comes and cuts off the blackberry crop. Then if any time you have a surplus, some one is ready to purchase, or if your home market is overstocked, the wholesale dealer is ready to take all you have to spare.

DISCUSSION.

Mr. Wilcox inquired as to cause of failure of the Snyder.

Mr. Danforth did not know the cause unless it was from lack of drainage. The land needed thorough drainage by tilling and he would try that the coming season. Other varieties had succeeded well. He had a clay subsoil, and there was standing water on the ground at times.

Mr. Busse. I would like to ask how you cover the Ancient Briton without breaking the canes?

Mr. Danforth. We use a fork to loosen the dirt on one side of the hill and then bend them over. The ground descends to the north and we bend them carefully up the hill, using the foot and in handling wearing a leather apron.

Secretary Hillman inquired as to the amount of his grape crop.

Mr. Danforth said it was a good yield, but he had not had much

time at home, and could not answer definitely.

Secretary Hillman. What varieties are you growing ?

Mr. Danforth. We have the Concord, Delaware and some of the Rogers

President Elliot. Have you kept any record of the amount of fruit you have gathered per square rod of any of these different varieties you are cultivating ?

Mr. Danforth. I haven't this last season; but I have received from three-quarters of an acre of ground three hundred and fifteen dollars, besides what was used by the family.

Mr. Pearce recommended mulching strawberries between the rows; as early as the first of October putting on four or five inches of mulching and covering the plants to the depth of an inch.

Mr. Danforth said mulching was of advantage to prevent drouth. He had raised good crops for twelve years, and the last was one not to be ashamed of.

Mr. Cutler. As to the plan of burning the plants off after the crop, I would say I tried it with my strawberries and found it injured the plants.

Mr. Danforth. You want to give them a slight burning on a windy day; you can burn too much and destroy the root; you want to do it just right. You will get rid of the vines and have the best crop of berries.

President Elliot. And get rid of the insects too.

Mr. Day. What is your location ?

Mr. Danforth. I am two miles west of Red Wing. We have all kinds of soil, but the best results are generally on a sandy loam. I prefer a gentle slope to any other location I can get.

The following was read by the Secretary :

FRUIT GROWING AMONG THE MENNONITES—CULTURE OF THE DEWBERRY.

By Dewain Cook, Windom.

S. D. Hillman, Secretary, etc.:

Yours of Dec. 19th at hand, requesting a short article on fruit growing among the Russian Mennonites, and a few notes on the Dewberry.

About one-fourth of the population of Cottonwood County are Russian Mennonites. They are an honest, sociable and prosperous

people. Coming from a country where fruit was abundant, they take considerable interest in horticulture; nearly all of them have their well-kept groves and flower gardens, their currant, raspberry and goosberry patch, grape vines, apple trees, etc.

It may be of interest to the public to know that they are planting freely of the seeds, and are growing seedlings of many varieties of the fruits of their former homes in the old country. They have grown fine crops of seedling Russian cherries and plums.

They have also many seedling Russian apple trees, and several varieties of Russian pears; the most common is a variety they call the Kruskaeye, which is a beautiful and rapid-growing tree, claimed to be as hardy as the cottonwood. I have seen specimens of this tree twelve feet high, and about six inches in diameter.

At our county fair the past fall our Mennonite neighbors took most of the premiums offered for fruit, including the best collection of fruit.

THE DEWBERRY.

I consider the dewberry of special value for the Northwest, particularly on the prairies, for the following reasons: Being of low, spreading growth, the vines are not injured by our heavy winds or snow banks; they are as easily given winter protection (where necessary) as the strawberry.

The dewberry (*Lucretia*) is the only blackberry recommended for general cultivation by the Eastern Iowa Horticultural Society. I think the Dewberry will soon be popular all over the Northwest.

My experience in growing the dewberry has been mostly confined to the variety known as the Windom. I will give you a short description of it.

Old canes grow from one and one-half to two feet high, with numerous short branches; is short-jointed, often three or four to the inch; fruit-stems rather long and slender; blossoms all on the outside of the hill, nearly hiding the foliage from view; the blossoms and young berries on each hill usually have the appearance of growing in one immense cluster, but as the berries get size the fruit stem droops, the plant gradually settles, and at the time of ripening the fruit is mostly shaded by the new growth of the plant, and is thus protected from the sun, wind and beating rains. Fruit will keep perfectly on the vines ten days or more after turning black. There is usually some imperfect fruit, sometimes considerable of it.

A few have failed to make a success in growing the dewberry. I

believe the cause in most cases was in not understanding the nature and wants of the plant they cultivated. The difficulty I believe is this. Many varieties are pistillate; some varieties are weak in pollen, but when properly managed are exceedingly productive.

It is essential to success with most varieties of the dewberry that we understand the various causes of imperfect fruit, and when we have learned this, and the remedy, we have learned the art of successful dewberry culture, as well as of many other varieties of small fruits.

To begin with I should select the best variety I could find, and plant on rich soil, in rows five feet apart and about two feet in the row, giving thorough cultivation the first two or three seasons. As a rule they make but small growth the first season; the next season, if the conditions are favorable, they will often make an immense growth of cane, the condition desired for propagating by layering; but as you value your fruit crop do not do it; it is a heavy draft on the vine, causing a late growth and poorly developed fruit buds, and a corresponding tendency to imperfect fruit the following season.

Again give your plants some kind of winter protection, if only snow; they are as easily protected by mulching as the strawberry. If the canes are much injured by the winter or otherwise we can hardly expect them to produce an abundance of pollen, or to perfect a large crop of fruit.

Again the rapid and excessive growth of canes, caused by rich soil and much cultivation, is not its normal condition, and is unfavorable to the production of perfect fruit.

Pinching back the new growth and cutting all the suckers out, will produce extra fine fruit, but with the grower for the market I hardly think it will pay. High culture should end where it ceases to be profitable.

When the dewberry begins to bear well the new canes grow less rapidly, are hardier, have stronger fruit buds and consequently better fruit the next season. I allow the vines to mat in the row and cut out but few suckers. It needs in some respects about the same management as the strawberry. It has this difference, it takes the dewberry two years to get ready for a crop but it will continue profitable in the same patch for many years.

The conditions of success are: Good varieties, good soil, thorough cultivation of young plants, keeping free from all weeds, and winter protection. Always remembering that anything that weakens the vitality of the plant *must* be avoided.

The following paper was read by the Secretary:

EARLY BEETS AND TOMATOES.

By Joshua Allyn, Red Wing.

S. D. Hillman, Secretary, etc.:

Your program at hand. I see I am booked for early beets and tomatoes. I regret I cannot attend the meeting this year, and must give you a brief written report of everything. As this is my own practical experience it may not amount to anything with others, but I will endeavor to give you my method of raising early beets.

About the middle of March the seed is sowed in shallow boxes; my boxes are about twenty-four by eighteen inches in size, four inches deep. I try to have four hundred to five hundred plants in each box; they are placed in hot house and forced to rapid growth until middle of April; then set boxes in cold frames and gradually harden them until they will stand quite frosty air. By the first week in May they will do to set out or transplant in bed. As soon as the ground can be worked in the spring these beds must be manured, plowed, dragged and worked thoroughly and two or three times before setting the plants. This stirring the ground warms and loosens it, and the young roots can soon get the benefit to repay all trouble.

The same directions can be followed for turnips, onions, etc., especially when sets are scarce. Early onions can be grown this way, and only need to be tried with success to be followed each year.

These articles of food may seem of small account, but I find in this small place extra early beets amount to quite a little. I think the Minneapolis market could easily take care of forty thousand bunches before the usual crop is ready.

EARLY TOMATOES.

Tomato seeds are sown in same kind of boxes as beets. For the earliest varieties sow first of March. We use Canada Vick for early. A week later sow late kinds. With us the Acme does best usually for late. The first idea is healthy, stocky plants, and I urge them as fast as possible; with this object in view they must have plenty of fresh, warm air to grow dark colored leaves, heavy roots and thick stock. I do not allow mine to stop growing.

When they have three or four leaves I pick out with care, transplant in other boxes, same size, give same temperature and treatment

until about the middle of April, when they are ready to leave the hot house and to try the compost bed.

The method of forming the compost bed is a point I shall have to explain; it is made of stable manure hauled during winters, and the deeper the better. I place my frames on this and fill them in with earth five or six inches deep; place on sash; in a day or so the dirt is warm; then use all the care possible in setting out the plants. To have root whole set with care; leave sash off all the time it is safe, giving the tops all the air you can. The under heat will take care of the roots, although it may seem to a new beginner too much.

If you give them the proper attention, by the tenth or twentieth of May you will have No. 1 plants, heavy roots, full tops with buds and even blossoms. I have had them well set with tomatoes before setting them out in the field.

They are now ready for the next place, which should have been chosen with care on a light, sandy soil, sloping to the south, should be well worked and manured. The last plowing I have done on the day I set them out, and I give it a good top dressing; then thoroughly drag it. About 4 P. M. set your plants, which must be well watered the previous night. Before taking up the ground must be saturated, then in the morning lift each one from the bed with plenty of earth; press gently between two hands the earth in a ball; place in a cool cellar in boxes until setting out in the afternoon; or even the next afternoon they will keep damp and fresh treated in this way. Of course after a shower is the best time; but do not wait for that as they will do well without.

Now I have one hand go with narrow spade and spade holes about six inches deep, another hand with water, a pint or more to each hole; another hand drops the plant in the hole, and the last one places the plant aright, firmly settles the dirt and the plants will not even wilt; your first buds are sure of fruit unless the frost takes them, which at the twentieth of May seldom happens, although I had a whole field of them cut down after this date.

The cultivator should be started soon, even in a day or two, and often used.

The compost bed is used for lettuce and other early things. When so used a tight board fence is placed around it and the hogs have it for the summer to work and root it. When fall comes I have a fine bed of manure, well rotted and worked over, ready to haul on the land to make room for a new compost bed.

REPORT ON VEGETABLES AND SMALL FRUITS.

By Wm. Lyons, Minneapolis.

The past season has not been as favorable for the gardener or farmer as the average, it being one of the dryest ever known in the Northwest, yet in the vicinity of Minneapolis and St. Paul there were quite a number of refreshing showers, which done a great deal of good; but they were local in their nature. Thus while one location got rain, others only a few miles apart had to suffer from drouth.

Early vegetables were extra fine and abundant, owing to a very favorable spring, and brought satisfactory prices.

Late planted vegetables, such as potatoes, cabbage, celery, etc., were benefited by late rains, and yielded a good crop; and, where properly cared for, brought the best returns for the gardener's labor.

A severe and an unexpected frost in October did a great deal of damage to potatoes, and destroyed nearly all the late cabbage crop, consequently vegetables are scarce and dear in our markets.

At the present time, while the early and late vegetables yielded good crops, the medium planting were almost, and in some instances entire failures, the potato crop seeming to suffer most from the effects of the drouth. Our markets were well supplied with home grown vegetables in their season, except celery, of which the supply generally came from Michigan.

I don't feel like charging the drouth altogether with our short crop of potatoes; in the absence of a name for the difficulty I will call it a blight. About the 20th of June there were several heavy showers; immediately after I noticed small spots of rust on the leaves, and they continued to grow larger until the leaf was destroyed; then the vine became affected and died a premature death. All the potatoes in my locality that had reached a certain stage of growth were affected in the same way.

Would like to hear what Prof. Porter has to say on the subject. I had seven acres affected in this way; the land had been seeded to clover and timothy, and pastured for a number of years; broke up the fall previous. At the time the blight struck them they were as promising a patch of potatoes as I ever saw.

Early Ohio and Pearl of Savoy yielded about 100 bushels per acre. Clark's No. 1, Beauty of Hebron, White Star, and White Elephant were not worth digging.

FRUITS.

I will speak first of strawberries. They suffered more from drouth

than any other small fruit in this locality. The first pickings were small and inferior. About the middle of the season the drouth was broken by some heavy showers, which gave everything a new lease of life, and strawberries did fairly well to the end of the season; some late patches on moist land yielded a good crop and brought fair prices.

The rain came at the right time for raspberries, the reds yielding the largest crop I ever remember of seeing in this vicinity; black raspberries, what few were grown, did very well.

Blackberries yielded a large crop of fine fruit and brought high prices. This delicious fruit is sadly neglected, by our fruit men. Currants were also a good crop, and brought high prices. If our fruit men don't move faster in this matter in the future than they have in the past, it will be a long time before our markets are glutted with either blackberries or currants. Gooseberries, like the Wilson strawberry, won't grow on my soil.

THE PRIZE ESSAYS.

I am glad our Society has taken a new departure this year, and in the right direction, namely, offering prizes for essays written by young men and young women. I have often felt and remarked that for some reason young men and women do not attend and take part in these meetings as much as they should; the making of intelligent horticulturists ought to begin with youth and vigor. The Society can do nothing that will yield grander results than that of getting the young men and women of the State interested in horticulture.

I would suggest that, instead of offering only one large prize for the best essay, that it would be better to offer smaller prizes and more of them. Composition in the country is sadly neglected. Many of the young folks understand fairly well how to grow crops of fruit or vegetables, but you ask them to put their ideas on paper and they can't do it, since they are not trained in that way.

DISCUSSION.

Prof. Porter. With regard to the cause of blight on potatoes, referred to by Mr. Lyon, I would say that I observed the same condition on our grounds. I have been investigating the matter somewhat. As "two swallows don't make a summer," I have nothing to say as yet as to remedies, at least till another season.

Mr. Smith. I had a patch of Early Rose that was heavily mulched, using about five inches of mulching on the surface between the rows;

the result was a yield of over a hundred bushels to the acre. In another patch adjoining there was no mulching used and the potatoes died and produced no crop.

Col. Stevens. The secret, I presume, was the moisture caused by the use of the mulching. That is no doubt quite important in a dry season like the last one.

President Elliot stated that a covering of straw was often beneficial in retaining moisture, especially with light and sandy soil. When the heat is too intense the vines become cooked and blight results.

Mr. Herzog was called upon to give his experience with potatoes, and stated that he had planted two acres of Beauty of Hebron and an acre and a half of Burbank Seedling; planted side by side on sandy soil. The former variety yielded two hundred and twenty-five bushels per acre and the latter but seventy-two bushels, and were comparatively worthless. He could not understand the cause of the failure.

President Elliot said the Burbank would not thrive on sandy soil, whereas the Beauty of Hebron was at home on sandy soil.

Mr. Smith. I planted two bushels of Burbank on sandy soil and didn't get my seed back.

Mr. Harris, from the committee on award of premiums, presented a report, which was, on motion, adopted:

AWARD OF PREMIUMS.

We, the members of the committee on awards, have discharged our duty to the best of our ability, and report the following:

APPLES.

	Premium.	Amount.
Best collection Minnesota apples, Ditus Day, Farmington	First.	\$5 00
Best display Wealthy, Ditus Day, Farmington.....	First.	3 00
Plate seedling apples, J. S. B. Thompson, Grundy Centre, Iowa	Honorable mention	

GRAPES.

Best display Brighton, A. W. Latham, Excelsior	First.	5 00
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CRANBERRIES.

Display cultivated cranberries, A. B. Lone, Pine Ridge	First.	5 00
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PLANTS AND FLOWERS.

Display ornamental and flowering plants, Mendenhall greenhouse, Minneapolis.....	First.	\$5 00
Collection roses in pots, Mendenhall greenhouse, Minneapolis....	First.	2 00
Display geraniums, Mendenhall greenhouse, Minneapolis.....	First.	2 00
Single plant in bloom, Mendenhall greenhouse, Minneapolis.....	First.	2 00
Display Begonias, Mendenhall greenhouse, Minneapolis.....	First.	2 00
Display carnations, Mendenhall greenhouse, Minneapolis.....	First.	2 00

CUT FLOWERS.

Floral design, Mendenhall greenhouse, Minneapolis.....	First.	5 00
Collection roses, Mendenhall greenhouse, Minneapolis.....	First.	3 00
Hand bouquet, Mendenhall greenhouse, Minneapolis	First.	3 00

VEGETABLES

Best display, William Lyons, Minneapolis.....	First.	5 00
Best display, H. F. Busse, Minneapolis....	Second.	3 00
Early Potatoes H. F. Busse, Minneapolis.....	First.	2 00
Early Potatoes, William Lyons, Minneapolis....	Second.	1 00
Winter and spring potatoes, H. F. Busse, Minneapolis.	First.	2 00
Winter and spring potatoes, William Lyons, Minneapolis.....	Second.	1 00
Onions, William Lyons, Minneapolis....	First.	2 00
Onions, Wethersfield, H. F. Busse, Minneapolis	Second.	1 00
Turnips, William Lyons, Minneapolis	First.	2 00
Turnips, H. F. Busse, Minneapolis.....	Second.	1 00
Beets, William Lyons, Minneapolis.....	First.	1 00
Beets, H. F. Busse, Minneapolis.....	Second.	50
Carrots, William Lyons, Minneapolis.....	First.	1 00
Carrots, H. F. Busse, Minneapolis	Second.	50
Hubbard squash, G. B. Gould, Minneapolis	First.	1 00
Hubbard squash, William Lyons, Minneapolis	Second.	50
Winter cabbage, H. F. Busse, Minneapolis	First.	1 00
Winter cabbage, William Lyons, Minneapolis	Second.	50

PANTRY STORES.

Display fruit in glass jars, Miss Julia Lyons, Minneapolis.....	First.	5 00
Display canned fruit, C. L. Smith, Minneapolis	First.	3 00
Display canned fruits, Miss Julia Lyons, Minneapolis.....	Second.	2 00
Display jellies, Miss Julia Lyons, Minneapolis....	First.	2 00
Display jellies, C. L. Smith, Minneapolis...	Second.	1 00
Jar mixed pickles, Miss Julia Lyons, Minneapolis	First.	1 00
Jar mixed pickles, C. L. Smith, Minneapolis	Second.	50
Home made vinegar, J. S. Harris, La Crescent.....	First.	1 00
Home made vinegar, C. L. Smith, Minneapolis.....	Second.	50

Sample comb honey, William Danforth, Red Wing	First.	\$1 00
Sample comb honey, William Urie, Minneapolis.....	Second.	50
Sample strained honey, William Urie, Minneapolis	First.	1 00
Sample Strained honey, William Danforth, Red Wing	Second.	50
Can Cheney plums, J. S. Harris, La Crescent.	Special.	2 00
Ten varieties pickles in jars, Miss Grace L. Smith, Minneapolis ..	Special.	2 00

The meeting then adjourned till 2 o'clock P. M.

AFTERNOON SESSION.

THURSDAY, JANUARY 19, 1888.

The meeting was called to order at 2 o'clock P. M. by President Elliot.

The *ad interim*, or District reports of the Vice Presidents being in order, the following were presented:

REPORT FROM FIRST DISTRICT.

By Vice President A. W. Sias, Rochester.

The fruit outlook in our district is truly encouraging. Messrs. Corp, Somerville, Pond, Johnston, Hoganson, Vine and many others report good crops, and some of them more fruit than in 1886.

STRAWBERRIES.

The introduction of the matchless Jessie adds new vigor and deeper interest in strawberry culture. Hart's Minnesota seedling is panning out much better than we anticipated, its leaves stand nobly against drouth. Mr. Samuel Welch, one of our best gardeners, says it surpasses all others with him. For a late variety we know of nothing better than the Manchester. The Crescent still takes the majority vote.

RASPRERRIES.

Give me the Brandywine for a market berry. It is doubtful if it has a superior as a cooking or canning fruit among red raspberries. The Cuthbert when covered in fall is profitable. Scheffer's Colossal is one of the largest, pretty tart, and not equal to the first named for market.

BLACKBERRIES.

Stone's Hardy fell behind the Snyder and Ancient Briton quite a little this year. Why it was not as good as last year I am not able to say. The Thornless was left uncovered again last winter and froze down to the snow line. Cover everything in the blackberry line, and don't forget that the Windom dewberry is rich and good, and can be covered much quicker than the high bush.

GRAPES.

The largest and best grape crop ever grown in the First district was harvested last fall. Everything, even the Pocklington (which is too late for an ordinary season) ripened fairly well. The leaven deposited in this district Oct. 4, 1866, by such men as Col. D. A. Robertson, John S. Harris, Wyman Elliot, Chas. Hoag, and a few others, has been slowly working, till it finally resulted in the organization of the "Southern Minnesota Horticultural Society."

Mr. Dartt presented the following report, as Superintendent of the Experimental Station recently established by act of the legislature at Owatonna:

STATE EXPERIMENTAL TREE STATION AT OWATONNA.

By Supt. E. H. S. Dartt.

Mr. President and Members :

In accordance with the resolution passed by this Society at its last meeting a law has been enacted establishing this station and requiring its superintendent to report to you in person at each of your annual winter meetings. This clearly recognizes you as the best guardian of the horticultural interests of the State, and it empowers you to ask of the Superintendent of this station in an authoritative manner, What are you doing? What do you intend to do, and how do you propose to do it? And since you have the right to nominate his successor he will be very likely to regard your wishes. It will be my endeavor to answer the above questions as briefly as possible keeping in mind the importance of the subject.

For causes beyond my control I was unable to commence actual labor until the fourth of last May. At that time about three acres of land

in an oat field was set apart for exclusively experimental purposes, and placed under my entire control; this has been surrounded on three sides, or nearly so, with evergreen trees eight to ten feet high, trimmed up four feet and set twenty feet apart, which were well cultivated through the season, and though the drouth was severe, yet every one grew, proving the efficacy of cultivation as a protection against drouth.

I had previously sent out postal cards to our leading horticulturists soliciting contributions, and had ordered a small bill from Prof. Budd of Iowa, and one from Robt. Douglass & Son, Waukegan, Ill.

I received a hundred seedling apple trees from P. M. Gideon, and set about two hundred of my own raising and two hundred root grafts of several varieties. These trees, numbering in all about two thousand, covered about a quarter of an acre of land. They were well cultivated, and the ground was sowed to oats in August with a view of securing partial winter protection.

Of trees not yet thoroughly tested in this locality, I have planted the Catalpa, Russian Mulberry, European Alder, Black Cherry, Golden Arbor Vitæ, White-tipped Arbor Vitæ, Little Gem Arbor Vitæ, Austrian Pine, Hemlock, Spruce, Colorado Blue Spruce, Douglass Spruce and Siberian Fir. I have planted seeds of Siberian Larch, Siberian Fir, Nordman's Fir and Norway Pine, which have proved an entire failure, attributable, I think, to late planting and want of vitality in seed. I have also planted small quantities of seed of Duchess, Tetofsky, Dartt's Hybrid, Orange and Greenwood Crabs, Hard Maple, White Ash, Butternut and Black Walnut.

Since entering upon my duties I have concluded that the growing of trees from seed must of necessity become an important adjunct to a successful experimental tree station. So much knowledge and skill is required to grow evergreens, birches and some other deciduous trees from seed, that men have made it a business of itself, and I raise the question whether it is not best to leave this branch to those men and use our energies in other directions.

Of this plat of land nearly one acre had been entirely abandoned to quick, or quack grass, as commonly called by former cultivators. This was broke the first of June, backset in August and dragged many times over. It is expected that plowing and dragging and raking off roots in spring will make it fit for a crop next season, and that very thorough cultivation thereafter will keep it in good condition.

Whilst our main object may be to test trees as to their general adaptation to our climate as it is, yet if we can do anything to either soften our climate or strengthen the trees, it seems desirable for us

to do so. We know that apple trees are benefited by being partially shaded on the south, but we do not know what amount of shade is best, or what other trees would be thus benefited.

It is, I think, generally admitted that it is our long-continued severe cold, freezing our trees nearly dry, that puts them in condition to have the wreck completed by the drying winds, hot sun of spring or summer. Now if we can supply this needed moisture by spraying our trees, or in any other way acceptable to the fickle Dame Nature, we have gained a point. But when and how shall we do it?

It is claimed that insect pests, injurious to trees and fruits, are on the increase, and we know they are very numerous. It would seem that the proper place to investigate and to devise means for their prevention and destruction would be on an experimental tree station. Thus our field for experiment seems to expand in whatever direction we turn.

In addition to the three acres mentioned, there are many acres more awaiting our occupancy. The buildings of the institution are placed on an elevation, and are entirely exposed to the bleak winds and drifting snows of winter, and the hot sun of summer. The management are eager for the protection of windbreaks and groves, and the home adornment of orchard and lawn, and the subject of more extensive timber plantations has received favorable consideration. It is the legitimate work of this station to supply these prime necessities in the shortest possible time.

It is my intention to make this the Mecca of tree worshipers—to form the most perfect arboretum to be found in all the cold Northwest. And I expect to do it by laboring patiently and energetically, guided by your wisdom.

Mr. Dartt also read his report as Vice President:

REPORT FROM SECOND DISTRICT.

By Vice President E. H. S. Dartt, Owatonna.

Mr. President, Ladies and Gentlemen:

The experience of our people during the past year has not increased their faith in fruit growing, especially as regards the standard apple. The effects of our severe winter were not perceptible till spring. Then the Duchess and other trees of like hardiness standing on lowish

ground, and which had been injured by previous winters, died out to such an extent that we are forced to the conclusion that it is useless with our present knowledge, or want of it, to plant even the Duchess in any but favorable localities.

The crab apples have behaved indifferently for many years. Some have died, some bear worthless fruit, others have occasionally borne a fair crop of good fruit, but barrenness has been the rule. If we would restore the confidence of the people we must present varieties, either standard or crab, that will grow in all ordinary situations and bear fruit of fair size and quality and in liberal quantity; or, in other words, we must give them a perfectly reliable, long-lived, productive *fruit tree* adapted to this climate. I have only one variety that I have thoroughly tested and find fully up to this standard in every respect. It is the Greenwood crab. It ripens with the Duchess, and can only be valuable where that variety is not successfully grown. I offer the Greenwood crab as my contribution towards the formation of a reliable crab list.

The fruit crop was nearly an entire failure, caused, I think, by spring frost, drouth and insects. Currants seem to have been destroyed by frost, strawberries by drouth, and apples and plums by the three causes combined. Grapes did fairly well, and I have no doubt by planting early ripening varieties they will be very profitably grown in future.

We will mention a few of our forest trees under cultivation:

The Norway spruce is not quite hardy enough to withstand all the effects of the snow line; the lower branches are frequently injured, but it makes a magnificent tree and promises long life.

The White spruce is more hardy—seldom browns, is of finer foliage and more ornamental while young. Our oldest trees are only ten or twelve years.

Scotch pine is one of our most hardy and rapid growing trees while young, but in cultivated or soft ground it is likely to be blown over, and it becomes less thrifty and more open with age.

White pine will evidently make a fine forest tree, but may require the protection of surrounding trees. With me it needs further trial.

The European larch maintains its reputation as a rapidly growing beautiful tree, but its desirability for stakes and posts does not much surpass the basswood. Whether it will improve with age and the heart wood of large trees will become durable remains to be demonstrated.

The European white birch and the European Alder seem sufficient-

ly hardy, grow rapidly, and take the correct form without pruning.

The soft or silver maple seems to be growing in favor, the only objection being its liability to split down in heavy winds. A little early pruning to prevent the formation of heavy side branches or forks will tend to remove that objection.

The hard maple seems more sensitive to excessive moisture and drouth, and has died out in some cases after attaining a diameter of four or five inches. It needs further trial.

The box elder is losing ground, for though on deep, rich soil it makes a rapid growth and dense shade, yet on poorer soils it is likely to become stunted and is frequently injured by borers.

The butternut and black walnut trees in this section seem to be doing remarkably well, and have commenced bearing nuts in a way that is very encouraging; and the scarcity and high price of the lumber of the latter point to it as one of the most valuable of all our timber trees.

There seems to be two critical periods in the life of all trees. The first we will call the "snow line" period. Here trees are not only liable to be crushed by snow drifts but they are subjected to the greatest degree of cold, often followed by a sudden change to heat, caused by the reflection of the sun's rays from the snow.

The other critical period we will call the period of "expansion." It strikes the apple tree when it is turned out to grass, or when it produces a bountiful crop. And it strikes other trees when we deprive them of those elements and surroundings which their natures demand. When we use all the means within our reach to adjust nature's balance with the greatest precision, then will our greatest successes be achieved.

"Then let us search through Nature's vast domain,
And treasure well each bit of truth we gain.
For Nature's laws but speak the will of God,
Frail man should bow and kiss the threatening rod."

REPORT FROM THIRD DISTRICT.

By Vice President M. Cutler, Sumter.

Mr. President, and Fellow Members:

As usual, I have to report that but few apples except Siberians were grown in our district the past season, and that the crop of crab

apples was lighter than usual, the Transcendent being the only one that bore largely.

Plums were a total failure. Heavy snow drifts broke down many of the red raspberries; those not broken down bore well. Had they been laid down and covered they would not have been injured by the snow.

I had a big crop of Gregg raspberries on a couple of rows that were covered with snow last winter.

My crop of strawberries amounted to over three thousand boxes, mostly on old beds without cultivation. Being on low land the drouth did not injure them.

Stone's Hardy blackberries that were covered bore quite well, but were not first-class berries.

Currants and gooseberries were a failure. Owing to drouth, but few trees set last spring are alive.

Interest in fruit growing is increasing, and we hear of new plantations of grapes and berries being set out. Some of our ladies are appearing in market with fruit for sale.

Prices of small fruits were good, and demand never better. Potatoes were a very poor crop, and are worth one dollar per bushel.

We have heard little of swindling tree agents, and believe with a few amendments the present nursery stock law is a good one, and should be kept on the statute books.

I received about fifty grape vines from the State experimental farm about the twentieth of May, and although the season was very dry, I think all but two or three are alive. Query: Should grape vines be set as late as above indicated, or earlier?

MARKETING BERRIES.

Marketing fruit is of great importance to the berry grower. A poor salesman may have the finest of fruit and make nothing out of it, while a good salesman without good fruit will be in the same condition. So we find that to be successful we must have nice fruit. The berries must be large, of beautiful color, and look fresh and clean. Unless the market is close at hand they should be firm, and picked as soon as ripe enough. If shipped to a distant market they should be picked the day they are shipped. If there are any dirty berries they should be picked, washed, and used at home, or thrown away, but never sent to market, remembering that a good customer is easier lost than gained. Berries should be shipped in neat and attractive pack-

ages and good measure given. Buyers like to see well filled boxes. I have found boxes bought of A. W. Well & Co., St. Joseph, Mich., the best for my trade. I find that few customers know the difference in size of boxes, and believe the small size well filled give better satisfaction than large ones poorly filled. I have generally ordered the large ones, but I have ordered from Minneapolis a few times and got small ones badly mildewed. Boxes should be bought and made before warm weather. If shipped to distant points, arrangements should be made with reliable firms before the shipping season opens, or great loss may occur. If you have more at any time than your regular customers will take, do not overstock your home market and reduce the price, but ship the surplus to a commission man and get what you can. The markets are not generally overstocked more than three or four days, and it is easier to hold the market at a fair price than to get it raised after it has once made a break.

Another important consideration is in having the shipping season as long as possible. I find that an unmulched old strawberry bed furnishes the earliest berries, and by keeping the mulch on part of the new bed I prolong the season a few days. And that the earliest and latest berries sell the best.

REPORT FROM FOURTH DISTRICT.

By Vice President N. J. Stubbs, Long Lake.

Officers and Members of the State Horticultural Society:

It is with pleasure that I present you with a few notes on the progress of fruit growing the past season, on the north shore of Lake Minnetonka and vicinity.

Although the past season has been remarkably dry, with the exception of apples the yield was an average one.

Of all our small fruits, the strawberry takes the lead for general market purposes. The Crescent and Wilson are planted mostly. On sandy soil the Manchester succeeds well, and is quite free from disease; the berries are large, uniform in size and very attractive in color, making a valuable berry for market.

Of the newer varieties the Bubach and Jesse are very promising; the plants set last spring that survived the dry weather made a fine growth, showing great vigor of plant, and yielded berries that were large and of good flavor. These varieties are slow of propagation.

The planting of currants has increased considerably over that of other years. The crop was light, not over half a yield, caused by late frosts and dry weather. The white grape currant, with its great shining crystal berries and long bunches, is not well appreciated. I see but few of them on the market, so they command a better price than reds.

Fay's Prolific fruited this past season, is immense in size and moderately prolific; when the price of plants gets to be reasonable, if they prove hardy enough for our climate, they will pay to plant largely.

Downing's gooseberry is a failure with us, on account of mildew. Smith's Seedling and Houghton are good, but unless we can obtain something larger and better than we have yet found in gooseberries, it will not pay to attempt their cultivation.

Ancient Briton, Snyder and Stone's Hardy blackberries have been planted in small quantities, with the intention of bending down and covering with earth to protect in winter; no variety will succeed without this care. A few of the Lucretia Dewberries have been planted, with a fair promise of fruit another season.

There are but few making a success of growing raspberries with any varieties except the Turner, for want of care at proper time and winter protection. Cuthbert stands well, and holds a high rank as a first-class market berry, and yet it has a good competitor in the Marlboro, which with me has proved the most valuable of all. The berries are more nearly round than Cuthbert, and have a deeper red, holding their color to the last; they stand shipping extremely well, as it is quite a firm berry and hangs on the bushes well after it is ripe. We commenced picking Marlow the twenty-sixth of June, and picked the last about the twenty-fifth of July. I believe it to be the most valuable red raspberry ever introduced in the Northwest, especially if it does as well in other localities. We commend it for trial everywhere.

The past season has been a very favorable one for grapes, the yield generally being a good one and quite free from disease and insects. As yet, for market purposes I do not think we have any variety in red superior to the Delaware; in black, Moore's Early and Worden are probably the most valuable. Of the newer varieties that have fruited with me, the Jessica has proved exceedingly valuable, as the vines are very vigorous, free from disease, very prolific and as early as Moore's Early; in quality as good as the Delaware; it is one of the best of white grapes.

REPORT FROM FIFTH DISTRICT.

By Vice President G. W. Fuller, Litchfield.

I am supposed to represent the district in which I live, the Fifth, which embraces the northern portion of the State.

I am also supposed to have a "general impression of the horticultural interests of my district."

In Goodhue county some fifteen years ago there were some fine orchards, but I am told that all the apple trees have failed, excepting a few Tetofsky, Duchess and Wealthy on the bluffs near the river.

I can speak from my own knowledge only of the section west of the Big Woods. And a few words tell the story so far as apples are concerned. With few exceptions, all the large apples and many of the crabs have gone the way of the many varieties, with which our tables were filled in the early days of our Society. The Transcendent is the only real iron-clad, and the only one that has brought and is still bringing steady and permanent returns. The Hyslop is not so hardy, and the trees have nearly all failed. Beaches Sweet has stood and borne well in some localities, but failed in others. The Minnesota is hardy, but does not bear the fruit we look for. I hear of some trees of the Virginia Crab are bearing well in the timber.

In regard to the small fruits, I can speak confidently and hopefully. But here we are confined to the few tried varieties. It does not do to depend upon new things. The cherry and the much advertised Fay currant are perfect failures. An ordinary winter kills them, on my grounds. But there is no discount on the old Red and White Dutch, the White Grape and Black Naples. The Houghton and Downing gooseberry do fairly well. The Somers and perhaps the Philadelphia are the only raspberry that will do anything without being covered, and it is much better to cover them.

I think that in the greater part of this district the true course for us to take is to make no attempt to grow apples except the Transcendent and perhaps two or three other crabs, and give chief attention to currants, strawberries, raspberries, and gooseberries, and confine ourselves to the proved and best varieties of them, and leave the experimenters and theorists to experiments and theories, until some permanent result is obtained.

DISCUSSION.

Mr. Sias inquired if Mr. Dartt would recommend the Duchess except in favorable locations.

Mr. Dartt said on the highest ground in his orchards trees stood best, but he had recently grubbed out several acres of his orchard and seeded the ground to grass, thinking grass more profitable than apple trees.

Mr. Smith. What is the soil on that high ground?

Mr. Dartt. In one orchard there is a strong mixture of sand, but considerable clay towards the south part. I have tried about all the locations in the neighborhood, as well as different kinds of soil. My trees on low ground amount to nothing.

Mr. Pearce. Is the general character of the soil rich or poor?

Mr. Dartt. Some of it is rich and some of it is poor. Along Maple creek some of the knolls are sandy. I have a knoll in my young orchard, but the land produces good crops. The grass kills out trees if allowed to form a sod about them.

Mr. Sias. My question has not been fully answered, as to whether it pays to grow the Duchess?

Mr. Dartt. On my best grounds it has paid; on the poorest it has not.

Mr. Bunnell. But you call your highest ground your poorest?

Mr. Dartt. Yes; but I have made it rich, and there it has paid the best. The best young trees in the neighborhood are in a hen yard; the ground has been greatly enriched and the trees have grown finely; so far I have failed to observe any ill effects from excessive use of manure.

Col. Stevens. I am afraid Mr. Dartt, as usual, takes a too despondent view in regard to his orchard. I was there a few years ago, and he then said, like Mr. Ford used to, that we never could do anything here in raising fruit; but lo, and behold! we found a fine orchard loaded with apples as ripe as could be.

Mr. Dartt. How long ago?

Col. Stevens. Not very long; and since then I have come to the conclusion that Mr. Dartt believes just the reverse of what he says in regard to his orchard. [Laughter.] Another thing; it is well known the European Larch is a beautiful tree and lasts almost as long as the oak. I think he must have the common tamarac instead of the larch.

Mr. Dartt. I have tried setting the larch top down, but it rots off in two or three years. I find it season-checks.

Mr. Pearce. The tamarac lasts with us at Minnetonka better than the white oak. Mr. Douglass gives instances where it has been known to last for fifty years.

Mr. Dartt. That may be with heart wood.

Mr. Pearce. The sap of any wood won't last.

Mr. Dartt. You noticed what I said?

Mr. Pearce. Well, that is a misrepresentation. [Laughter.]

Mr. Smith. How old does it have to get before you have heart wood that will be suitable for posts?

President Elliot. At least eight or ten years.

Mr. Smith. I have tried them that were over twelve years old and they would rot in two years. I understand very well what Col. Stevens means, but there are many things stated at times that do not bear investigation. Robert Douglass is a reliable dealer, but he may have been misinformed.

Mr. Pearce. I think it is poor policy to dispute what Robert Douglass says.

Mr. Smith. It may be poor policy but these are solid facts.

Prof. Porter. May it not be that both these conditions of things may be true? May not the difference in experience in one case be due to the difference in the seasons when the timber was cut?

Mr. Sias. There is another feature of this paper with which I was much astonished. He represents his to be a very trying location; but it is singular that the ash leaved maple will not succeed as well as black walnut. With me the ash leaved maple appears to be perfectly hardy and reliable.

Prof. Porter. There seems to be something peculiar about that location. Black walnut succeeds as far north as the Minnesota river. Suppose he has the most trying location in Minnesota, I found terminal buds of box elder there uninjured and apparently perfectly hardy. I went down there and I found things very much as Col. Stevens described them. I don't know exactly how to account for this except on the theory advanced by Col. Stevens.

Mr. Dartt. I don't like to talk so often, but I suppose if I am on one side and all the rest on the other that you will excuse me. They misstate my paper. I have not said that the box elder died at all.

Mr. Pearce. That is the statement as we understood it; we call for the reading of the paper again.

Mr. Gibbs. All he stated was that box elder was failing on his poorest and highest ground and doing well on good ground.

President Elliot. It does not seem to amount to enough to make much ado about; we must not take too much time.

Mr. Dartt. I stated the box elder was losing ground; it does not have a fair chance, and is not planted as much as formerly. I have

used it as a windbreak, and it has not been a satisfactory tree. It has not grown as rapidly as soft maple, and does not get up much faster than the Scotch pine.

Mr. Pearce. I was surprised last week to find the black walnut thriving at Hutchinson.

Col. Stevens. They thrive and grow by the hundreds along the Minnesota, and between here and Glencoe.

Mr. Brand. In regard to the Duchess I would say there are in this State three localities; I might call them most favorable, favorable, and unfavorable. Mr. Dartt is in the latter locality. Only two or three miles from his house there is a Duchess orchard that is very productive. I refer to Mr. G. W. Buffum's.

Mr. Dartt. I can bear a few hits from these men that are inclined to hold onto the old usages in spite of the facts.

Mr. Pearce. You think you are not guilty?

Mr. Dartt. I plead not guilty, sir.

The Society then proceeded to the election of officers for the ensuing year.

ANNUAL ELECTION OF OFFICERS.

The following list of officers were duly elected:

President—Wyman Elliot, Minneapolis.

Vice Presidents—A. W. Sias, Rochester; E. H. S. Dartt, Owatonna; M. Cutler, Sumter; N. J. Stubbs, Long Lake; and G. W. Fuller, Litchfield.

Secretary—S. D. Hillman, Minneapolis.

Treasurer—Ditus Day, Farmington.

Executive Committee—J. S. Harris, Chairman, La Crescent; J. M. Underwood, Lake City; O. F. Brand, Faribault; F. G. Gould, Excelsior; Isaac Gilpatrick, Minneapolis.

Librarian—E. A. Cuzner, Minneapolis.

Entomologist—Prof. O. W. Oestlund, Minneapolis.

The President was authorized to appoint standing committees, the same to be afterwards announced.

On motion of Mr. Harris an additional committee on Diseases of Grapes was added to the list of standing committees.

Mr. Wilcox suggested the propriety of a committee being appointed or of enlarging the duties of the committee on Nomenclature. He regarded it as very essential for the prosperity of horticulture that a

proper classification of fruits, especially of hardy varieties adapted to Minnesota, should be made.

Col. Stevens said the Society in former years revised the fruit lists each year, lists of hardy small fruits, evergreens, and everything on the catalogue, recommending some varieties for general planting, some for experiment, and others for favorable localities.

Mr. Harris thought it would be well to have such a list as Mr. Wilcox suggested, after the plan pursued with reference to classification of varieties by the American Pomological Society. Such a list had never been published in any of our reports.

Mr. Wilcox said he had been unable to find such a classification, and as he was a new comer here desired to know what were considered to be the hardiest varieties.

The report of the special committee on fruit lists was called for and Mr. Sias of that committee presented the following:

REVISION OF FRUIT LISTS.

APPLES.

For general cultivation—Duchess, Hibernial.

For trial—Autumn Streaked.

For favorable localities—Wealthy.

For general trial—Red Cheeked, Plikanoff, Antonovka, Yellow Anis, Red Anis, Yellow Transparent, McMahon's White, Soiree, Russian Green, White Pigeon.

HYBRIDS.

Whitney, Beaches Sweet, Early Strawberry, Orange, Martha, Transcendent, Florence, Powers.

NATIVE PLUMS.

De Soto, Weaver, Rollingstone, Forest Garden.

For trial—Cheney, Rockford, and other best varieties to be obtained.

GRAPES.

Worden, Moore's Early, Concord, Delaware, Brighton, Lady.

For trial—Niagara, Woodruff's Red, Wilder, Early Victor.

BLACKBERRIES.

Ancient Briton, Snyder, Stone's Hardy.

RASPBERRIES.

Blackcaps—Ohio, Souhegan, Gregg.

Red—Cuthbert, Turner, Brandywine, Marlboro.

COURRANTS.

Red Dutch, White Grape, Victoria, Long Bunch Holland, Stewart's Seedling.

STRAWBERRIES.

Crescent, Wilson.

DEWBERRIES.

For trial—Lucretia, Windom.

On motion of Mr. Brand the report was received.

DISCUSSION.

Mr. Pearce moved the adoption of the list of apples recommended by the committee for general cultivation.

Mr. Dartt. Mr. President, I don't think we know enough about those varieties to recommend them for general cultivation throughout the State. I am not in favor of recommending any variety that is not hardy.

Mr. Smith. I don't think they are hardy enough.

Mr. Dartt. A tree may bear under some circumstances and in a certain location, and yet be unsuitable for general cultivation. We ought not to make the mistakes of the past; we should recommend only what we know is good and reliable; so if people plant them, in the course of ten or fifteen years they will have something. I move to insert the words, "for trial."

Col. Stevens desired Tetofsky added to the list, as the hardiest apple grown in Minnesota.

Mr. Harris moved to adopt the Duchess for general cultivation.

Mr. Sias. I am quite well acquainted with all these new varieties; I have grown some of them many years. I am satisfied every one of them is hardier than the Duchess. They have been before us for years, and we ought to add a little to the list, although there may be many who would prefer to see it limited to a single variety, the Duchess. We are certainly making little progress.

Mr. Gilpatrick. We are not making progress.

Mr. Sias. Unless we can show some progress we ought to stay at home.

Mr. Underwood. We had better send Mr. Dartt as a delegate to Iowa while we get up a list.

Mr. Gilpatrick. I don't want him to go.

Mr. Pearce. I am ashamed of Mr. Dartt. When we say for "general cultivation" we mean, of course, in favorable localities. That applies in every state in the Union; a man who is going to set an orchard, whether in Ohio, Michigan, Illinois or in this State, will not set it where it will be of no value. Put Duchess in favorable localities and it will stand.

Now, those other varieties have stood in most unfavorable places for fourteen years; in one place that I know of where every common variety failed, and are still standing and yielding crops of fruit. One tree yielded six bushels of apples. Put the same tree on favorable ground and it would do much better. I refer to Mr. Peterson; his trees stand on unfavorable ground, and yet they have come through all these test winters and have never killed a particle; and now our friend Dartt has the impudence to get up here and say: "Cut them all off."

Mr. Dartt. Mr. President, I perhaps ought to say a few words. If I have been "impudent" of course it has been in questioning the hardiness or the durability of the larch. I have been called to account for disputing the hardiness of the Wealthy for all localities. Notwithstanding you sent me to Iowa, you have found it to be a fact that its hardiness was at least questionable.

Now, sir, whether we have progressed or not, it is a fact that this Society ought not to recommend one thing to the people of our State they do not know to be reliable, and something that will grow under ordinary circumstances, and produce fruit in sufficient quantities and of a quality to be valuable for cultivation. When that is accomplished we will have established the ends of a reliable list, and by so doing merit the confidence of the people of the State. But if we jump to conclusions for the sake of making people believe we are progressing we are doing what is unwarranted, we will have another setback in the future and the result will do us no good. Impudence! Where is the impudence in telling the straight truth? [Applause.]

Mr. Thompson. Mr. President, I can hardly sit still and keep quiet. It appears that my friend Mr. Dartt is backsliding a little, since I roomed with him at Dubuque; he has changed considerable. I came up here expecting to find some good soil, and I still believe there is. He talks about favorable localities. To cut the story short, if you will set your Duchess on a soil that has bituminous clay for a

sub-soil, or if it hasn't feed it, then if you don't raise good apples just call me a fool.

A gentleman over there is looking this way; I will ask the question and answer it also. Feed it with salt and wood ashes. If you can't get that get salaratus, using a pound to a hundred pounds of ashes, and scatter them around and among the trees. It will have a marked effect on the health and vigor of the orchard. I have tried it on the Duchess and have seen the effects at a distance of thirty feet from the trees. I can increase the size of the fruit one-third by feeding. Another thing; every second or fourth year give your orchard a good mulching with manure that has plenty of ammonia in it.

I would advise my friend Darrt to send to his congressman and get a copy of the report on the geological survey of the Northwestern territory and to read that; to pull off his coat and see what he will find with his book; if he don't find bitumenous clay, or soil mixed with magnesia and carbonate of lime, then you have a wonderful soil. Any farmer with the assistance of that report ought to be able to pick out favorable localities for planting an orchard on his own farm. The best orchard I know of in Iowa is located on land that has a sub-soil of bitumenous clay; it is near Emmetsburg, and is situated on a gravelly knoll. My own orchard is in a similar location.

Mr. Harris. I insist on commencing with Duchess, as I am afraid we shall never get through.

The motion to recommend for favorable localities was lost. The motion of Mr. Harris to recommend for general cultivation was then adopted.

Mr. Harris moved to recommend Tetofsky for favorable localities.

Col. Stevens said he was opposed to the motion.

Mr. Underwood said they might as well recommend farmers to sell their wheat in favorable localities. They know very well now what to do, and if they don't, a good, sharp tree agent can tell them. This Society spends a good deal of unnecessary time over these matters of recommending varieties. Farmers don't know whether they want a particular variety, and never will know. It is waste of time to quibble about favorable localities; of course they won't plant trees except in their most favorable localities anyway.

Tetofsky was then recommended for general cultivation.

Mr. Harris. I move to recommend Hibernial for general trial.

Mr. Gibbs. I have understood it has been the practice of the Society not to recommend anything for general trial until a sufficient number had been propagated by nurserymen to supply the de-

mand. I want to ask if that is the rule at present, and if trees of Hiberna can be obtained?

Mr. Harris. My impression is that they can.

Mr. Gibbs. If they can be obtained I want to give an order for some.

Mr. Cutler. I think that is a good suggestion. I notice people give their order for something and if dealers cannot fill the order they put in something else.

Mr. Sias. Last fall Mr. Peterson had them for sale, and I think Mr. Tuttle of Baraboo has them as well as some others in this State.

Mr. Gibbs. If you recommend varieties for general trial and they are not generally propagated by nurserymen in quantities to meet the demand, why these swindling tree agents will put them on their lists and sell to everybody from whom they can obtain an order, filling it with something else; hence you place the people at a disadvantage when you recommend anything for general trial that cannot be obtained true to name.

President Elliot. We are going to have honest tree peddlers after this.

Mr. Gibbs. You will pardon me, I have been away two years and I am a planter.

Mr. Sias. I think this won't have much effect on tree frauds the best we can do with it; we don't need to spend much time on that. These agents have their own lists and they are going to recommend and sell them.

Mr. Brand. I prefer to recommend for planting in limited quantities. Hiberna cannot be found anywhere except in the hands of experts. It has been tried only in favorable localities and for that reason should not be recommended for general trial.

Mr. Gibbs. Pardon me once more. I have reason to believe there is not a bearing tree of Hiberna in the State. Trees usually called Hiberna, for instance those of Andrew Peterson, at Carver, I believe to be Lieby; they have been fully identified as such. Mr. Tuttle is growing true Hiberna. I was the first one to call the attention of this Society to the orchard of Mr. Peterson.

Mr. Sias. I have both the Lieby and Hiberna. I procured scions from Washington, and have compared them with others. Hiberna is the better tree; Lieby has a low top and more of a spreading habit, and to my mind there is a marked difference in them.

Mr. Dartt. How many bushels of apples did you ever raise of that kind?

Mr. Sias. I guess that is a little out of order.

Mr. Gibbs. It is the Peterson trees we are talking about, and the proper thing to do is to recommend Lieby.

Mr. Brand. I saw Mr. Peterson's trees in September. He showed me what he called Ostroloff Glass, Hibernial and Lieby. On a careful inspection I could see no difference in them, or not as much as you will find in a similar number of Duchess.

Mr. Gibbs. He has no doubt followed the labels that he received with the trees. Ostroloff Glass is a small, ordinary greenish apple; the one he calls Ostroloff has large stripes and is a coarse grained apple. There is very little if any difference in the varieties on the grounds of Mr. Peterson.

The motion was lost.

Mr. Latham moved to recommend the Lieby in place of Hibernial for general cultivation. Carried.

Mr. Luedloff was called upon to state what success he had with Ostroloff.

Mr. Luedloff said he had two kinds of trees. They were different from Hibernial. Part of them were received of Prof. Budd. They are the same as Mr. Peterson's, having smooth wood and the same kind of leaf, which is glossy. One kind from Prof. Budd has a sort of woolly leaf.

Mr. Dartt. How many bushels have you ever raised?

Mr. Luedloff said his trees had not borne every year, but they were perfectly hardy. He had thirty or forty Russian varieties that were looking well, while all his old native trees were dead. He had planted about one hundred and sixty of the new Russian varieties.

President Elliot inquired if he had any young trees for sale.

Mr. Luedloff replied that he had, but he said it was not always proper to recommend them. Strawberries may do well in some places and grapes may grow well in the garden, while in other places they may fail. So it is with the apple; one kind of apple may do in one garden and fail entirely in another. When we find a kind that is hardy, that is the kind we want to grow. After all this is experimental work, and every man must experiment for himself.

Mr. Harris said he had received four trees of Ostroloff Glass from Prof. Budd, which had not yet fruited, but they had stood the last hard winters better than anything else he had.

Mr. Dartt. Does it stand any better than Ben Davis at the same age? That variety was apparently hardy when the trees were small. We had some easy winters when I had Ben Davis. I don't believe in

recommending many varieties. I have heard that this variety has been hardy in several places in this State during the last three winters.

Mr. Brand. Prof. Budd sent me some trees three or four years ago, stating that they were the hardiest kinds he knew of, but none of them looked like healthy trees. So far as I know there are no Ostro-koff trees bearing in this State. The variety which has been taken for that is the Lieby.

Mr. Gibbs. Mr. President, I think I could take two minutes of your time profitably on this matter. The people of Dakota look largely to the reports that reach them from Minnesota and to your recommendations as a Society for direction as to what varieties to plant. The fact of the business is that in all this long list of Russians there is only one variety to be found in the State of Minnesota that has been growing and has been bearing successfully for a number of years, and which remains entirely hardy, and that is the Lieby, and that is being grown under various names. There are some thirty or forty varieties that are being grown in an experimental stage, but there is no more reason why one should be taken up and recommended than any other of these thirty or forty varieties. Mr. Latham has the Lieby that bear well and are hardy. But where can you find another of the varieties received from the Agricultural Department that has proved valuable? At the experimental grounds of Mr. Luedloff and Mr. Peterson the most of these little trees are just coming into bearing.

Mr. Pearce. Do you know anything about Autumn Streaked?

Mr. Gibbs. Nothing more than of about thirty or forty others. In all your reports they have been based on the history of top-worked Russians, and they have been mostly top-worked on crabs. Mr. Peterson, who was educated in horticulture in his native land, proceeded upon a correct basis at the start. He has root-grafted these different varieties and out of the whole department list has only been able to save three or four kinds; and there is nothing but the Lieby that shows entire hardiness after being in bearing for several years.

Mr. Pearce. I think you are in error in saying there is but one variety.

Mr. Gibbs. I mean bearing crops year after year, and a variety that contains elements that justify recommending it to the people for general trial.

Mr. Pearce. I have been watching Autumn Streaked for years and am much pleased with what I have seen of it.

Mr. Dartt. Order; we are not on the Autumn Streaked.

Mr. Sias. I wish to say just a word in regard to these important Russian families. There are a number of varieties that are very similar in character. We have the Anis family, the Transparent family, each containing a number of varieties of very close resemblance, but on close examination we can observe a difference. I have the Yellow and Red Anis and there is very little difference between them.

Mr. Dartt. What about Glass, the one under discussion?

Mr. Sias. I am coming around to the Glass works; it is in the same family as the Hiberna. I do not believe it is the same as that or the Lieby; I admit there is a close resemblance.

Mr. Gibbs. Did you understand me to say that Ostrokoff Glass and Lieby were the same?

Mr. Sias. I understood you to say there was only one variety at Mr. Peterson's, and that was the Lieby.

Mr. Gibbs. I say the variety he refers to as Hiberna is the Lieby. I know Charles Gibb and Prof. Budd identify them as the Lieby.

Mr. Dartt. Strike it out; strike it out.

The motion to place Ostrokoff on the list was lost.

Autumn Streaked was recommended for general trial in limited quantities and in favorable localities.

Wealthy was also recommended for trial in favorable localities.

The further revision of the fruit list was then laid upon the table.

Mr. Brand, of the committee on pine lands owned by the State, presented a report:

PINE LANDS IN MINNESOTA.

By O. F. Brand, Faribault.

Mr. President, and Members of the State Horticultural Society:

Pursuant to our appointment to investigate the extent and quality of pine lands belonging to the State from which timber has been cut, their location and practicability of their protection from fire and their improvement by planting, thinning, cultivation, etc., we beg leave to report as follows:

That supposing the most of the desired information could be obtained at the state auditor's office, I called there in November last, but was informed that no record of such lands was to be found in that office. I then addressed the following letter to the county auditor of each of eighteen counties in that part of the State where the lands under consideration are located:

FARIBAULT, Dec. 26, 1887.

Mr. Auditor:

DEAR SIR: I have been appointed by the State Horticultural Society chairman of a committee to ascertain the quantity of land in this State from which the pine has been cut and the land bid in by the State for taxes. Will you kindly inform me of the quantity of such land in your county, together with such information of its character as you may possess. The object of obtaining such information is to enable us to make recommendations as to what disposition had better be made of it. Whether it would be best for the State to undertake to rehabilitate said lands with pine or other forest trees under a comprehensive system of State forestry, or to let them remain as they are or sell them for what they will bring.

Your figures and advice in the premises will be thankfully received.

Very truly yours,

O. F. BRAND,

Chn. of Com.

In response to this letter I received answers from a few counties where no such land existed, but with the exception of one county no answer has been received from counties in which it was supposed the most of these lands were located, and the answer received gave no information as to the location of the lands, whether in forty acre tracts or otherwise. It is useless, in my opinion, to expect to get information from county officials outside of the regular duties of their office.

It is evident the information sought cannot be obtained without a visit to at least one of the counties where these lands are located, and we would recommend that one of our committee be directed to make a visit to the nearest county (say Pine county) to make a thorough examination of the nature and character of the lands in question, and report at our next annual meeting. The expense would be but little, and the object sought is of grave importance to the State. It might be well to extend the scope of the ground sought to be covered to include recommendations of a general character on forestry.

That some measures should be adopted at once to stop the ruthless destruction of our remaining forests, as well as to measure the present area, is a point on which all intelligent persons who consider not only the present, but the future welfare of the country, are agreed.

When the white men first began the settlement of our State, forty per cent of its total area was covered with timber. In 1880 it was estimated that one-half of the original area covered with timber had been cut off, and still the havoc goes on. We should take warning by

the fate of other nations and countries before it is too late. Portions of Asia, Northern Africa, of Greece and even of Alpine Europe, by the destruction of their timber, have been brought to a desolation almost as complete as that of the moon. At this date it is probable that not ten per cent of the proper agricultural portion of our State is covered with timber.

How much do we need? It is estimated by the best scientists of the age and of past ages that Germany needs 23 per cent of her land kept constantly in timber in order to secure the highest agricultural and healthful returns. When we consider her location, midway between the North Sea, the Baltic, and the Mediterranean, if she requires 23 per cent, what proportion is required by us in the interior of this great continent? No portion of the world more needs the presence of great and numerous forests to preserve an equilibrium of temperature than we. The same causes which produce great and sudden changes of temperature have almost equal effect on the amount of moisture in the atmosphere. Moisture is what we lack in our atmosphere. Prof. Tyndall says: "The removal for a single summer night of the aqueous vapor from the atmosphere that covers England would be attended with the destruction of every plant which a freezing temperature would kill. It may be safely predicted that whenever the air is dry the daily thermometric range, or the difference between heat and cold will be very great."

We all know evaporation is measured in a prodigiously rapid ratio with the velocity of the wind, and that anything that retards the motion of the wind is efficacious in diminishing the exhalation from the leaves of plants and evaporation from the soil. Timber is the only thing we can utilize for this purpose, and then when we consider the large amount of moisture that timber causes to be retained in the soil by rainfalls, mulch, and in retarding the surface water from rapid motion on uneven surfaces we realize that no civilized nation should regard the subject with profounder interest, or prosecute it with intenser energy than ours. Then let us take hold of the subject with a degree of earnestness that shall be commensurate with the important relation it bears to the material prosperity of our State.

DISCUSSION.

Mr. Smith said in order to get definite information as to the amount of these pine lands, it was necessary to go to the different counties where they were situated and make personal inspection of them. This subject was one of importance; it would be again brought before the

legislature. It was perhaps well for the Society to lead in the matter. As to the best thing to be done he could not say, and had no plan to submit. He had studied the forestry laws of Europe, and believed some system of forestry supervision by the State and general government was necessary. It was impossible to get the desired information at the state auditor's office, as these pine lands were largely held by speculators.

Mr. Dartt said it would be a difficult task for any man to visit these sparsely settled districts and make a personal inspection of those lands; one would need camping utensils, and it would be necessary to survey the whole country; to be provided with plats, etc. The scheme was impracticable, at least for the Society to undertake.

Mr. Young inquired as to the class of lands referred to.

Mr. Brand said it was the pine lands that had been cut off and that had reverted to the State on account of taxes.

Mr. Smith thought some law was necessary, providing that such lands as were not fit for agricultural purposes should be reserved for forestry purposes.

Mr. Young thought all the necessary information could be had at the office of the state auditor.

Mr. Brand thought it would be necessary to visit one or two counties to obtain any definite information as to the character and the condition of these lands.

On motion, it was decided to continue the committee another year, composed of Messrs. Brand, Boxell and Smith.

The forestry committee was also continued, Mr. Brand being named as chairman of the committee in place of Prof. McGinnis, who had left the State. The other members are Mr. Smith and Mr. Harris.

An adjournment was taken till 7 o'clock P. M.



EVENING SESSION.

THURSDAY, JANUARY 19, 1888.

The meeting was called to order at 7 o'clock P. M. by President Elliot.

THE NEW ORLEANS EXPOSITION.

President Elliot. I believe Mr. Gibbs wishes to make an explanation in regard to a matter that came up this morning, and he is at liberty to do so now.

Mr. Gibbs. It is simply for the purpose of correcting the record, if it needs correcting. During my absence at the morning session I have understood the question was asked by a member if any account had ever been rendered to the State of the expenditure of the moneys that were raised to collect and maintain the State collective exhibit at the World's Exposition at New Orleans; and some gentlemen who were here and who were connected with the exhibit made the best answer they could under the spur of the moment; but I feared in one or two points they might have misapprehended the facts, and to enable the Secretary to get them in the official report, I will answer the question, and also another question that came up.

The itemized vouchers for all expenditures were returned to the Governor of the State, under whose instructions all the work was done, and were duly audited at the close of each month and turned over to the State Auditor; and when the Exposition closed the matters that remained unadjusted were finally closed up, and all vouchers bearing the governor's approval were turned over to the State Auditor, and I presume will appear in the auditor's published report. So far in regard to that.

Then the question arose, as I understand, in regard to the preparation of the commissioner's report upon the subject. I left the State and changed my residence some four or five months after the close of the Exposition, but during all the time I was here I was anxious to and did proceed to make a report, but was unable to do so on account of the delay of two or three parties—who had important employment in connection with the exhibit to submit—to present and furnish their reports which would be necessarily parts of mine. Our failure to receive those reports has prevented the preparation of the complete re-

port up to this time. I am happy to state now, however, that matters are under way, under the instructions of the present governor, and with the aid of ex-Gov. Hubbard, to have a report prepared on that exhibit, and one that will be commensurate with the character of the exhibit itself, which you all remember was regarded as being as fine a State exhibit as there was in the Exposition, if not the finest of all.

That report will undoubtedly in a very brief period be prepared and turned over to Gov. McGill for such action as the next legislature may take in its wisdom on the subject. But I presume it will be published with the proper illustrations, and citizens of the State will be more pleased with the report itself than with the subject.

If the Secretary would now place his pencil upon his ear he would like to state a further fact. He understood the Society had received \$50, 'as premiums awarded on fruits, and some were no doubt surprised at receiving that money.

In the State exhibit there was some two hundred bushels of apples and a quantity of grapes. In his judgment they could not compete successfully for premiums; therefore no attempt was made to exhibit apples at horticultural hall, where competitive exhibits were made; he reserving them to go with the State exhibit in other buildings.

On grapes we had a fair show to make good our pretensions for growing as good grapes as can be grown anywhere in the United States, and several entries were made in the name of the Society, and a number of premiums afterward awarded.

He was very glad the Society had received the money, and the whole United States would share with them in the honor, for in contesting for the palm in choicest varieties they had secured these awards on fruits it was not supposed could be successfully raised in a cold climate.

The report of the committee on floriculture being called for, the following paper was then read:

ARCTIC FLOWERS.

By Mrs. C. O. Van Cleve, Minneapolis.

The mercury sinks in the bulb, men and women hurry along the pathways between walls of snow, as if pursued by some invisible but dangerous foe, and sitting down to write of flowers, I look out the window at my flower bed of last summer and behold a white, shapely mound, beautiful, but oh! so cold! It is the grave of my pretty cypress vine and sweet mignonette, my velvet pansies and bright ver-

benas, and other beauties that I loved; and I could weep, but that I know the spring will come by and by, the snow will melt, the sun will warm the earth, and my garden will bloom again in fragrant beauty. Rejoicing in this hope, there comes to me the thought, "How do people exist in the Arctic regions, with snow and ice and cold always about them? Are their hearts ever warmed and gladdened by the sight of flowers of any kind?"

Our ideas of the inhabitants of the Frigid zone were very vague, and we knew very little of their mode of living, their pursuits, etc., until modern travelers and scientists visited these regions and enlightened us in regard to them. Some have given glowing accounts of the peculiar beauties of those cold countries, and have awakened a strong desire in the minds of many to visit them. Standing in the art gallery at the Exposition, last August, before one of Mr. Bradford's inimitable pictures, more than one enthusiast might have been induced to enlist for an expedition to the North Pole, but the month of January in Minnesota is not a favorable time or place to obtain recruits for such an adventure.

Frederick Schwatka, the explorer, has given as the result of his Arctic voyages, some very interesting accounts of the flora of the extreme north. He says: "The Arctic waters, full of floating ice the year round, make the shores comparatively devoid of vegetation, except a stunted water sedge that is as hardy as the Canada thistle, and perchance a few straggling polar blossoms peeping through the moss, that seem strangely incongruous in the icy surroundings of general desolation, but, inland, the never setting sun, though seldom high above the horizon, can constantly accumulate its heat unobstructed by any loss at night, until it produces a vegetation in the little valleys that seems almost tropical when compared with the desolation that greets the eye in every other direction."

One of the most interesting considerations of Arctic flora is its origin, as given to us by that great pre-historic printing press, the fossil strata of the earth, and especially the revelations of what is called the nival flora of the non-frigid zones, or that which is found at high or Alpine altitudes, among climates similar to the polar region. During one of the geological periods, and not so very far back in the world's history either, a great sheet of thick ice crept down from the base of the north pole, and extended in many places half way across the temperate zone. Arctic weather prevailed to the tropics, and all the surroundings were in accord, even the plant life being only of that hardy, stunted kind that would resist such intense cold. But after a

while the earth got over this chill, and the great sheet of ice started to recede to its home in the north; and along with it went all the Arctic life, plants and animals; willows and walrus; moss and musk oxen. But the northward direction was not the only line of retreat left open to these refugees of the cold. They could also ascend the mountains and find the climate which they loved if they were only high enough, and this they did, even within the tropical region, and when the Alpine climbers ascend the snow-clad mountains of picturesque Switzerland and gather a pretty little bouquet of a dozen different nival flowers, on that barren zone, just before the perpetual snow and ice is reached, half of them will be of the same variety that some polar explorer has gathered that season, in the land of the midnight sun, to store away in his herbarium for future reference. One of the most prominent botanists who has studied this peculiar nival and polar flora was Professor Oswald Heer. In making a study of the nival flora of Switzerland he found 337 species of flowering plants at Alpine height, that is between 8,000 and 13,000 feet above the sea. Only one-tenth of these comprised species belonging to the lowlands of the surrounding country, while about one-half of these plants originated in the Arctic but had come from Scandinavia with the ice of the glacial period, and had been left stranded on the Alps, when the ice receded, as a floating object is left by the ebbing tide. And this word "ebbing" is not a bad one to use, for there are scientists who believe that centuries from now this great sheet of ice will come again, and again recede ebbing and flowing in the life of the world as the ocean's tides do in ours. Therefore only two-fifths of the flowering plants of the Alps are strictly natives of the region they occupy. With a few wolfish dogs tied to a sled and a reindeer or two in the distance, an Alpine climber could easily imagine he was in the "great white zone." I feel like moving that a vote of thanks be given to the learned men alluded to above, that they have placed the next advent of the glacial period so far in the future that this horticultural Society, and all its immediate descendants will not be seriously incommoded by it.

An English botanist states that the tropics have from 40,000 to 50,000 species of plants, the north temperate zone about 20,000 species, and the Arctic 1,000 or less, with some 2,000 among the Alpine flora, or about 3,000 species enjoying (?) an Arctic climate. Small as this number is, it is sufficient to do away with the popular opinion that the polar regions and snow-clad mountains are practically devoid of vegetation. A fact that may surprise some is that while in the Arctic there are 762 kinds of flowers, a flowering plant has never

been found within the Antarctic circle. This may be because there are very few tracts of land there of any extent, and there is, in fact no inland where the sun's rays can be absorbed and used for warming and vivifying the earth.

Of the seven hundred and sixty-two kinds of flowering plants in the Arctic, only fifty of them are wholly residents of that zone, and very few of the flowers that blossom in that chilly region have any perfume.

The colors generally are of the cold tints, white and light yellow predominating. In the depths of the ocean are found the largest and most vigorous specimens of plant life, such as colossal kelps and similar life that grow throughout the year. Nearly all the plants in these cold regions are biennial or perennial; the seasons are too short for annuals, and these perennials begin to push their growth through the snow at the first cessation of the vernal cold.

Mr. Schwatka says he has seen flowers in bloom on King Williams Land so close to the snow that the foot could be put down and leave an impression on the edge of the snow and crush the flower at the same step. And Middendorf, a Siberian traveler of note, says he has seen a rhododendron in that country in full bloom when the roots and stems of the plant were completely incased in soil frozen as hard as a stone.

Among the useful plants found in the Arctic are the Scurvy grass, a rough, cruciferous plant that is famous as a cure for the terrible disease from which it is named, and Barley; and so rapid is the growth of this last named plant, that, in seasons at all favorable, it is ready to cut two months after sowing, and two crops are raised in one season.

Besides the plants alluded to, which are similar in habit to those in more favored climates, there is another kind that seems to love to burrow and spread their species in and on the bare snow and ice itself. And naturalists have succeeded in separating forty-two species of purely snow and ice plants from the many they have examined. All of these require the microscope to determine what they are, and nearly all are of a rich crimson or some of the tints of red, which would look cheerful if it were not for the suggestion of splotches of blood on the snow. Agassiz thus describes these singular plants as seen on the Alps: "The deep repose, the purity of aspect of every object, the snow broken only by ridges of angular rocks, produce an effect no less beautiful than solemn. Sometimes in the midst of the wide expanse one comes upon a patch of the so-called red snow of the

Alps. At a distance, one would say that such a spot marked some terrible scene of blood, but as you come nearer the hues are so tender and delicate, as they fade from deep red to rose, and so die in the pure, colorless snow around, that the first impression is completely dispelled. This red snow is an organic growth, a plant springing up in such abundance that it colors extensive surfaces just as the microscopic plants dye our pools with green in the spring. It is an Alga (*Protozoitis miralis*) well known in the Arctics, where it forms wide fields in the summer."

This same high authority who seems to find beauty and fitness everywhere, says: "There are valleys in the Alps far above six thousand feet which have no glaciers, and where perpetual snow is seen only on the northern sides. These contrasts in temperature lead to the most wonderful contrasts in the aspect of the soil; summer and winter lie side by side, and bright flowers look out from the edge of snows that never melt. Where the warm winds prevail there may be sheltered spots at the height of ten or eleven thousand feet, isolated nooks opening southward where the most exquisite flowers bloom in the midst of perpetual snow and ice; and occasionally I have seen a bright little flower with a cap of snow over it, that seemed to be its shelter. The flowers give indeed a peculiar charm to these high Alpine regions. Occurring often in beds of the same kind, forming green, blue, or yellow patches, they seem nestled close together in sheltered spots, or even in fissures and chasms of the rock, where they gather in dense quantities. Even in the sternest scenery of the Alps some sign of vegetation lingers, and I remember to have found a tuft of lichens growing on the only rock which pierced through the ice on the summit of the Jung-frau. It was a species then unknown to botanists, since described under the name of *Umbellicarus Higinis*."

And now it would be very delightful if those who have listened patiently to this dissertation on Arctic flora, could step from this hall into one or other of the beautiful greenhouses of which our city has a right to feel proud, and as their eyes feasted on the tropical beauty to be found there, they might be led to think that there are, all over the world, not excluding our own highly favored city, many who are sick and wretched, and, wicked, it may be, whose lives have been very dreary and barren, around whom no sweet tender influences have been thrown, and who have little or no hope for this world or another. And with that thought might come the impulse, to do something to brighten and make better these sad lives. From such an impulse as this has grown the Flower Mission, and the good it has ac-

complished will never be fully known or realized in this life; it is like sowing seed which is to spring up and bear blossoms that may never perfectly unfold here, but which in that heavenly clime where there is no frost or snow, or chilling winds, will open up in loveliness and beauty of which we cannot now conceive. Some years since a city mission was established in the city of St. Petersburg, Russia, which was to labor in various ways to elevate the poor and wretched. One special work given the ladies to do is visiting the hospitals and carrying comforts of various kinds to the sufferers. It is narrated of one who had been on this errand of mercy, and was returning with an empty basket, in which she had taken flowers to brighten the sick rooms and cheer the weak ones, that in passing a church she found a poor girl asleep on the steps. Her basket was ransacked for a single flower; the result of her search was one modest violet, and this she laid on the bosom of the sleeping one. The girl had worn such a violet as she received the parental blessing when, two years previously, she had left her father and mother for service in the distant city, where, alas! she had fallen before the force of temptation and had become a poor soiled daughter of the street. On waking the unexpected flower stirred all the old tender associations, which ended in the resolution: "I will arise and go to my Father," and in his boundless love she found peace and a Savior. And she who did so small a thing for the Master's sake may never know in this world the result of her loving act, but what a glad surprise awaits her when in the "beautiful home over there" she greets among the redeemed ones the sinful girl who lay asleep, alone, in that great city and waked to newness of life, through the instrumentality of a simple heart's-ease laid on her bosom by the hand of a pitying, loving sister. Such illustrations of the salutary influence of flowers prove that they have not been created exclusively for our own personal gratification, but that we may share them with others, for their cheer and encouragement, and adding new zest to our floricultural studies make us feel that they are well worth the time and labor we devote to them.

On motion of Mr. Harris, a vote of thanks was given Mrs. Van Cleve for her able and interesting paper.

FLOWERS AND ROSES.

By Mrs. M. S. Gould, Excelsior.

God's first and best gift to man was a garden, in which everything was not only "good for food," but "pleasant to the sight."

The love of beauty in nature is natural Heaven-born. It can be said of flowers, says Dr. Tuttle, but scarcely of any other thing, that they are universally admired. There is no time or place where they are inappropriate, no decoration to which they cannot add a charm. They lend fragrance and beauty to homes of joy and to homes of sorrow. They may tell our love for the living and our mourning for those who have passed away. There is no private meeting of friends, no public festival, nor anniversary of any kind which they may not embellish or grace with some sentiment. They make crowns for children and chaplets for heroes; and our nation could find no more delicate, genuine way of expressing its gratitude for the soldiers who perished in the late war than by covering the places where they sleep with flowers."

It has not been my lot to have much leisure or strength to devote to the cultivation of flowers. But as we have always been blessed with a few, hoping I may help someone less fortunate than myself, and that I may encourage someone who has never tried to raise them, or those who "never have any luck" to try once more, having in remembrance bare and desolate homes in "this broad land of ours," and agreeing with Mrs. Van Cleve that it may be a part of our duty as a horticultural Society to implant and foster in the minds of our youth a love for the culture of plants, I will mention a few of the most hardy which may be grown with the least possible labor:

Perennials come first in the list of easy culture, requiring very little care if properly planted.

Annuals necessitate more labor, the ground needing to be prepared *every* spring, and *early*, just when the busy farmer is tempted to reply to such requests, "Yes, by and by; can't do it now; wait till I get over my rush." Could fathers and brothers always realize the blessings these God-given treasures are, they would probably oftener contrive in some way to lend the "helping hand" to provide something "pleasant to the sight."

Gov. Colman once said, while urging this duty: "Grow flowers; they are elevating, purifying, harmonizing in their influence upon the character of yourself, your wife and your children. The farmer who

does not cultivate flowers, or encourage it, does not do his whole duty to his family."

And Miss Shore writes: "The most humble home may be brightened and its coarse surroundings made attractive by flowers. A neatly kept border, or a bed gay with blossoms of even the commonest varieties are certainly more pleasant and restful to the tired wife and mother than an untidy grassless yard, with fences down and pigs, calves, and geese roaming at will, as seen so often in the country. Half the time taken to keep them out would be amply sufficient to cultivate a few flowers.

If it should happen in any family that the willing hands are not strong, and the strong not willing, it is doubtful if more than a few annuals and hardy perennials should be undertaken.

And although it is pleasant to try something new occasionally, it seems wisest to depend mainly on those tried and proved varieties from which we can with confidence expect a reward of almost constant bloom, old, and yet ever new, delighting us continually with their beauty and fragrance.

The following varieties I would recommend by experience and observation as best adapted for those of little or no experience:

Phlox Drummondi, Chinese pinks, sweet peas, pansies, sweet alysum, verbenas, asters, nasturtiums, candytuft, petunias, balsams, larkspur, ten weeks stock, mignonette, and portulaca. Some of these, phlox, petunia, portulaca, and larkspur are self seeding, and labor can be saved by using the same bed, transplanting occasionally in the spring.

For a new beginner I would advise trying only a few varieties. Those wishing more can easily select from the many seed catalogues, nearly all giving directions for planting. If the necessary amount of earth cannot be spared or prepared for annuals try a few perennials. Phlox of many beautiful shades of color; bleeding heart and peonies—hardy, vigorous, and many of the new sorts delightfully fragrant—are improved by cultivation, but will spring up and bloom cheerily if neglected. I will also add the hollyhock (again in favor), in situations for tall flowers we know of nothing better. Vick says: "There are few plants whose flowers so perfectly combine large size and delicacy, quite as double and almost as pure and perfect as those of the camellia." I sometimes think this favorite old flower one of our best perennials. And tulips,—everyone who lives where the winters are so long and cold should have a bed of tulips, they bloom so early. Their visit is short, I confess, but other plants may be set between them so the bed may

not be left bare after they have faded. We have always used petunias for this.

Lastly but by no means least, the rose; the most delightful and queen of all flowers. I am thankful there are a few hardy varieties all may have. The choice and tender ones are worth trying for, though they require careful and skillful treatment. I believe nothing has so many enemies; among the most formidable we have found the aphids, rose caterpillar, bugs and spiders of various kinds, and mildew. Constant vigilance is the price of success.

Rose culture is comparatively a new industry in our family, in which, I confess, there is much for me to learn. Will mention, however, a few (from over one hundred varieties we have tried) which I believe, everything considered, have given best satisfaction, and which may be grown out doors in Minnesota if well protected during the winter.

Gen. Jacqueminot, Fisher Holmes, Louis Van Houtte, Baroness Rothchild, Mabel Morrison, Countess of Serenye, Eugene Verdier, Caroline de Sansel, Alfred Colomb, Salet Moss, Eliza Boelle and La France. Gen. Jacqueminot we value for its beauty, fragrance and hardiness. Fisher Holmes has been described as an improved Jacqueminot, and is, in my opinion, in some respects its superior, the petals having a little more substance, and in sunlight I think the color more beautiful. Of the three varieties, Louis Van Houtte, Fisher Holmes and Jacqueminot, Mr. Gould's choice is in the order named, Louis Van Houtte coming first, but for *evening* decoration the Jacqueminot is always preferred. We consider the Alfred Colomb a valuable rose, being fuller than the Jacqueminot and a better bloomer, giving more blooms late in the season, but not quite so beautiful in color. Baroness Rothchild and Mabel Morrison, though shy bloomers, are so exceedingly beautiful (also hardy) we would not willingly spare them from our list.

Eliza Boelle, white, dwarf habit, is a very free bloomer all through the season.

Gen. Washington, is a free bloomer, but the flowers are often imperfect; when perfect, a fine sort.

La France (Hybrid Tea), a delicate, silvery pink, large and fine, a most constant bloomer, considered by some as the sweetest and most useful of all roses.

Our Teas, Perle des Jardins, Sunset and Bon Silene, were greatly admired for their luxuriant growth and beautiful and abundant bloom.

The attempt to winter them out doors is an experiment; the result we consider extremely doubtful.

To any rose lover who indulges in luxuries, I would recommend these, even if they must be bought at the greenhouse every spring.

What I would give as the "key to success" is good, thrifty plants well planted, and *carefully tended during summer*.

I might add that this care is not altogether pleasurable, viz.: the battle with the rose enemies, but then I suppose we all expect "thorns with roses."

Mr. Sias moved a vote of thanks to Mrs. Gould for her valuable paper, and that it be placed on file for publication. Carried.

The following paper was then read:

AN AMATEUR'S FLOWER GARDEN.

By Frank H. Carleton, Minneapolis.

When your President asked me to say a few words upon an "Amateur's Flower Garden" my first impulse was to say "no," for I felt that I should make a sorry appearance alongside of many of the members of this Society. But the second thought came to me, that there is not sufficient interest in the healthful and delightful pastime of cultivating flowers, and so at the risk of being tedious I will relate a little of my own experience as an amateur cultivator of flowers.

Five years ago I could scarcely tell the difference between a Petunia and a portulaca. At that time my wife, in early spring, asked me to bring home a package of sweet alyssum seeds. As a matter of duty I obeyed, but I purchased the seeds with even less interest than a person usually displays when he purchases a box of matches. A few evenings later, by dint of much persuasion, I acted as a sort of listless laborer, and under strict surveillance and frequent urgings, made a small flower bed, in which the seeds were planted. I was not at all interested until the little things, in the course of about ten days pushed their tiny plant leaves through the soil. The process of growth interested me. Why did they grow and how? Whence came the life? And a multitude of questions which will never be answered until we get into the presence of the Giver of all life, forced themselves upon my mind. As the weeks passed by and a multitude of blossoms un-

folded each day with fresh fragrance, my interest increased and the love of flowers was born in my heart.

When next season came no one had to ask me to purchase seeds. Early in the spring evenings I was busy with the seed and plant catalogue. The close confinement indoors of my profession was telling upon me, and I determined to try a little amateur gardening for my morning and evening exercise. So I divided my tract of land in the middle—the rear part for vegetables, and the front half for flowers. I will not speak of the fresh tomatoes pulled for breakfast, even while the breakfast bell was being rung, or of the crisp lettuce, or of the early peas sweeter than any sugar, whose very freshness gives appetite to an invalid, but I will pass on to my flowers. Of course I made some mistakes the first season. I sowed many of my seeds too closely and did not weed sufficiently. I sowed nasturtiums and bachelors buttons in rich soil and got immense and vigorous plants, but no blossoms. I sowed asters in dry soil and got a few pinched up flowers. One cut worm would prematurely harvest a dozen plants and go undisturbed and grow fatter and fatter. But this was only for one season. I discovered that plants are as sensitive almost as human beings. It won't do to treat all alike,—if you do, some get angry and rebel. Some flowers, like the asters, and stocks, and pansies, are aristocratic, and want rich soil,—plenty to drink and plenty of sunlight,—others like the nasturtium and portulaca can't stand luxury. They want a poor soil and thrive better the drier they get. But all flowers are alike in one respect. None of them can stand weeds.

There is no place in the Union where annual flowers do better than in Minnesota. It is true that there are many states whose seasons are longer, but in none does nature do a better work in a short time than here. Annual flower seed grow quickly here, and flower quickly; and for the past three seasons my flowers have had their full period of blossoms and have gone to seed before the frosts came. The rapidity of growth here fully compensates for whatever we may lack in length of season.

I desire to dissent from the common view that hardy roses will not do well in Minnesota. They do better here than in Indiana or Illinois. It is true that our winters are somewhat severer; but it is the alternate freezing and thawing weather of early spring which injures the rose bushes and hollyhocks and other hardy plants, and not the steady cold weather of mid-winter, when they are protected by a mulch. Many a rose bush will pass unhurt through the severe weather we have been having since Christmas, and finally perish by being

uncovered too early in April. The open winters of Indiana and Ohio are not as good a protection to the rose bush as the heavy snows of our State, which come and stay until spring. In all the northern states mulching is necessary, and no more here than elsewhere. In mulching, however, care should be taken not to mulch too heavy, so as to exclude all air. Roses and hollyhocks and pansies and Chinese pinks (the dianthus) can easily be kept through the winter by a mulch; but the mulch should be loosely thrown on and a little air admitted; and the mulch should not be removed too quickly in the spring.

Rose bushes need pruning. I got my first lesson in this three years ago. On my lawn was a very handsome *Jacquiminot* which had weathered several winters and was immensely large, several of the branches being taller than my head. One spring evening the worthy President of this Society chanced to call. I pointed with pride to my bush. He shook his head. He simply took out an immense pocket knife and said nothing. But he slashed away at that rose bush, and the old shoots flew in all directions. That bush was a sorry sight when he got through with it. I felt bad, but smothered my grief. My grief, however, was soon turned to joy, as the new branches shot forward like arrows, and the multitude of blossoms in due time made it a marked object on the lawn. In this connection I might also add that many who raise flowers are too chary in cutting the blossoms. The more flowers you cut and give away the more you have. One flower in going to seed will take the vitality out of a score of blossoms. Never let a seed pod form. It will rob you of many blossoms. The best seeds are so cheap and accessible that no amateur can afford to raise them. I know a rich lady who, in order to raise a few seeds for the coming season allowed her early blossoms to go to seed and seriously curtailed her entire crop of blossoms, when five cents would have purchased all she wanted for the next spring. She saved her nickel, but practically lost her whole crop of sweet pea blossoms for the season.

It never pays for an amateur to raise seeds. The choicest seeds are now very cheap. The flowers should be picked as fast as they blossom (excepting of course the geranium blossoms on the lawn). Not only is it true that the more we pick the more we have, but it is also true that in the hands of an amateur the seeds will gradually degenerate. For this reason I always buy fresh seeds every year from a reliable house. The only exception to be made is in the case of the old-fashioned balsam, which has been improved so much in the last

few years as to be almost equal to a rose. Most flower seeds lose much of their vitality in a season or two, but a balsam seed ought to be two or three years old to give the best results.

But let us pass from general remarks to certain flowers. I will not pause to speak of geraniums, and heliotropes, and hot house plants, because we generally buy these plants of the florist; but first let us speak of some of the annuals, the old-fashioned garden flowers, which delighted our youth and were cultivated in the days gone by,—the aster, ten weeks stock or gilliflower, sweet pea, hollyhock, "youth and old age" as the Zinnia was once called, the "lady's slipper" or balsam, the pansy. etc. Within the past ten years all these have been greatly improved, and like most everything else specialists are at work each year improving the strain, and the same genius which has developed the dahlias and fuschia and gladiolus from what were once practically wild plants or weeds into the rich varieties which we now have, has also developed new beauty in these flowers.

First of all flowers, both for its beauty and constancy of bloom, I would name the pansy. For a few early blossoms it may be well to buy a dozen plants of the florist, but these from being "forced" at the green-house soon dwindle away. It is very easy to have fine large pansies through the entire summer season. As soon as the weather will permit, plant the seeds. They are slow to germinate, taking from ten to twenty days, but afterwards grow rapidly. When you transplant them into their permanent place do not be afraid of the sun,—they do well in the sun providing the soil is very rich and they have plenty of moisture. Some say pansies want shade. This is not my experience. They want a rich clayey soil and a great deal of moisture. But any rich soil will do, providing an abundance of moisture is furnished very early in the morning and after nightfall. The only benefit pansies derive from shade is from the moisture which shady locations give, and by a little care, according to my experience, larger and finer pansies can be raised in the sun than in the shade. But in buying seed get only the very best. The new shades of red and mahogany and bronze, and the solid single colors are fast taking the place of the common kinds. Indeed the pansy is the only flower which seems to transgress the rule that there is no family of plants in which blue, yellow and red in varieties of the same species, are found.

Next among annuals in point of beauty to the pansy, in my judgment, is the aster. It is a royal flower; many of its varieties, as for instance the Victoria and Truffaults peony flowered are unsurpassed.

this too must have a rich soil and plenty of moisture. Then comes the ten weeks stock or "gilliflower," and scabiosus or "mourning bride," and also the gailardia, of brilliant hues, also requiring a rich soil and moisture. And right here, speaking of plants which require moisture, let us remark that many do not know how to water plants. They sprinkle them. Now this is wrong. Sprinkling as it is generally done with a hose or sprinkler, generally wets only the surface of the ground, which causes the plants to send out many little surface roots, which are soon burned or dried up by the sun. When you water most plants the soil should be thoroughly drenched or saturated. One good drenching of the soil in which the water thoroughly saturates the ground, is worth half a dozen ordinary sprinklings.

There is no more fragrant flower in the garden than the sweet pea; and no bunch of flowers gives more beauty than an immense mass of sweet peas, whether it be on the sideboard as a bouquet or worn as a corsage flower. Many fail in raising sweet peas, and yet they are easily grown in great abundance. First of all they should be sown just as soon as the frost is out of the ground,—as soon as the soil can be worked. Don't wait for pleasant weather or be afraid of frosts, but put them in as soon as the soil can be worked. The richer the soil the better. The rule as given in the books is to plant them four inches deep, but experience has demonstrated a better way, as they often rot or fail to come up when under four inches of heavy spring soil.

They should be planted in double rows, the rows being about six inches apart, and the peas about an inch apart in each row. If they are at the outset planted four inches deep many will not come up, so I believe a better way is to dig a trench or hollow space about five inches deep, and then sow the peas and cover to the depth of an inch or so. Then as the peas grow gradually "hoe in" from time to time, until the hollow or trench has become even with the soil. In this way the roots which form from the germination of the pea will be four or five inches below the surface. As soon as the peas are up two or three inches, put up your frames for them to run upon. Their future success depends upon their being furnished with an early support.

Hollyhocks are again coming into fashion. Many of the double ones are equal to dahlias. When once in a garden they will seed themselves, and a clump of them gives a rustic beauty to any garden or lawn.

But I find my time is passing, and I have not yet alluded to that

grandest and richest of all summer flowering bulbs,—the gladiolus. There is nothing in the garden which requires less care than gladioli. They are raised easier than potatoes, and nothing will attract the eye of the passer-by so quickly. When the bulbs are once in the ground you have nothing to do but keep the weeds out and cut the flowers when they come. It is true that the bulbs are somewhat expensive at the outset, but they multiply rapidly, and if a person will save the little bulblets which form at the base of the large bulb each year, and plant them in separate drills, he will soon have a great abundance. I procured about a hundred bulbs of the named varieties three years ago, and I now have in my cellar about three bushels of bulbs for this spring's planting. If a person does not want to go to expense of buying bulbs let him buy a package of seeds, and many of them will blossom the second year, and from that time onward if he saves the bulbs and bulblets he will have plenty.

But I fear I am trespassing too much upon your patience, and with a brief statement of how I handle cut worms I will close. Of course if a person goes into the garden in the early morning and sees a plant has been cut by the worm at night he can usually find the worm within an inch or so of the plant and destroy it. This is a safe and sure way. But a couple of seasons ago I chanced to leave a small pile of grass which had been cut by the lawn mower in the garden. The next morning in removing it I found several cut worms under it. Whether attracted by the odor of the fresh grass, or not, I will not undertake to say, but they were there, and so now I regularly set this trap for them each spring and generally get a quantity each morning. Somehow the freshly cut grass draws them together.

I thank you for your kind attention to this hastily prepared paper, and in closing I submit whether there is any diversion more productive of health or cultivating to the taste, or where a person can get nearer to nature than by cultivating those flowers which God gives to all as a common blessing? Here nature smiles equally upon the humble and the wealthy, and a little industry is rewarded with gifts which decorate any home.



THE CLAIMS OF ENTOMOLOGY AS A DISTINCT SUBJECT
OF STUDY.

By Prof. O. W. Oestlund, Minneapolis.

The number of different kinds of insects now in existence is great, we would almost say innumerable. Their relation to man are manifold, and often of greatest importance. If all insects should at once become destroyed and the work that they now perform left undone, we know that the earth would soon become uninhabitable, at least to man and higher animals. Insects do not exist only as a matter of chance, or perchance to torment us if we become too wicked, or to blast our hopes by destroying the results of our work, as we would often like to believe. Their existence has a deeper significance than this. These small creatures, to which I would now call your attention for a few moments, found everywhere where man has yet put his steps, even to the ice-bound shores of the northern seas, seem to embody the very principles of vitality, activity and destruction.

VALUE OF INSECTS.

One of the most important and far-reaching results of their work is probably as scavengers. As soon as an animal falls dead to the ground, or any other animal matter becomes exposed, these little animated beings, which are ever on the alert, are at once ready to bounce upon it, tear it to pieces, bury it under ground, devour it, and soon again to change it to living animal matter. The great naturalist Linnæus used to say that a pair of blow-flies are able to devour an ox as soon as a lion. If you have observed these flies hover around a carcass, depositing their innumerable eggs, which will soon turn the object into a living mass of maggots, you will not only see the force of the assertion, but become greatly amazed at the rapidity with which nature is able to do away with a putrifying object that would only give off poison and death to every living object in the vicinity; and in place millions of flies are produced, which in turn are ready to perform the same duty as they may be called upon. Not only are the softer parts of the carcass that would first putrify immediately taken in charge by certain species, but even the hide, the hoofs and firmer portions of the body are all in turn attacked by other species, and soon nothing will be left but the dry mineral portion of the skeleton, which is now turned over to the sun and air to further disorganize at leisure, but now without any evil effect upon living beings. Not only

on land do insects perform this important work, but also in water. It is insects, together with other important classes of animals, that keep the water of our lakes and ponds clear and in motion, which otherwise would soon become stagnant and foul from accumulating filth and vegetable matter, and make it utterly worthless to man besides filling the air with foul gases.

The relation of insects to vegetation is a most important and intimate one. Through the admirable works of Mr. Darwin we are all more or less familiar with the important part that insects play in cross-fertilization of plants, and thus in promoting a vigorous and healthy growth. They are also of importance to vegetation by preparing and distributing fertilizing material by hastening on decay. You have probably all noticed how soon a dead tree will become riddled through and through with the galleries of insects or their larvæ, and the loosened bark falling to the ground, soon all will crumble down to dust under the industrious bands of the small workers; and in a few years will the giant of the forest be distributed to serve for a new and more vigorous growth, which may now occupy the very same spot that would else be filled with only the useless and unsightly remains probably for a century or more in the slow decay in air unaided by insects. But while thus a large class of insects are occupied in promoting a healthy vegetation by aiding cross-fertilization or by hastening on decay of dead matter and distributing the same as fertilizers, others and a most important class is occupied in checking a too rapid growth or increase of vegetation. At first sight this would appear to be a paradox, and only to prove that insects are useless and a plague to man. But if we have been lead to understand the balance of nature as a law, and one that is as beautiful as it is comprehensive, we will know that the one class is as important and necessary for the welfare of man as the other. There is a tendency of living objects to increase enormously and to occupy space to the exclusion of all others. Thus if a single species of plant would be allowed to increase without reserve it would soon come to fill all available space to the exclusion of all other plants of similar habit. An example of this law is furnished to every one of you in the tendency of weeds to overrun your grounds, which as native species are much hardier than those we cultivate, which can only thrive under the fostering care of man. To keep this tendency within proper bounds nature has provided more than one remedy, but one of the most important ones is undoubtedly insects. Each species of plant has therefore got its corresponding species of insects that are ever ready to keep it within proper bounds.

It has been calculated that on an average there are at least five species of insects that prove to be more or less injurious to each species of plant. The actual number will probably be somewhat larger, as the number of newly discovered insects has increased unexpectedly during the latter half of the present century. As soon as a plant therefore will increase under some favorable circumstances so as to exceed the proper bounds, these insects that prey upon it will also be favored by such an increase of food-plants, and will soon appear in a proportionately large number and check this undue increase of the plant.

While thus a large class of insects are occupied as scavengers on land and in water, and a still greater number to produce a healthy and luxuriant growth of vegetation, or to check an undue increase; not a small class are occupied in keeping the increase of these insects themselves within proper bounds, by preying upon them. A large class are directly carnivorous, the tigers and lions among insects, by preying upon every insect that comes in their way; another and more important class to man are parasites on other insects, their larvæ or eggs which they destroy. Thus the balance of nature is ever kept up, and this law is most beautifully exemplified in the case of insects.

GOOD AND BAD INSECTS.

Insects are moreover of importance as an article of commerce. Not only does the honey bee supply us with a delicious and healthy food, the cochineal insect with a magnificent coloring matter, but many other important products come directly or indirectly from insects, as shalac and silk the value of which amounts to millions annually. Insects come in more or less relation to man in almost every branch of industry with which we are acquainted.

That relation in which they attract the greatest attention is undoubtedly as injurious to our crops, and as this involves a loss of millions upon millions annually to our country, and to the individual often the greater part of his profit for the year, if not more, it is a question well worth our attention. This is applied entomology, and if time would allow it would be a profitable thing to stop just here and try to make it clear to all of us in what this relation consists, and to what extent the evil might be reduced. This is an evil, if we so must call it, which can never be altogether done away with, and which would not even be desirable under the present condition of things; but it can be reduced to a minimum, and this applied to a single crop of our State—the wheat crop—would make a difference of several millions annually in our favor.

These are a few of the subjects that present themselves to the student of entomology without going into details or into the realm of pure science. Entomology as a distinct subject of study, as a science, is what I will especially call your attention to this evening.

SCIENCE OF ENTOMOLOGY.

Not many centuries ago it was considered to be below the dignity of man to occupy himself with such trifling things as insects, and if anyone in spite of this dared to pursue the study his soundness of mind was liable to be questioned. Since that time we have learned to become a little more liberal. The general opinion is no longer openly against the subject, and we are all willing to concede its importance. But this is as far as we have advanced, and back of this there is yet a general indifference. It is still in the hands of a few.

But the work is ever advancing, and the time is dawning when this study will no longer be in the hands of a few, but the property of the people; and when we will have not only learned to know and concede the importance of the subject, but will have learned to feel its importance and give it that aid and sympathy which it requires to reach its full growth. Then, and only then, can we receive the full benefit that is to be derived from it as a science.

How is this indifference to be removed, and how are our people to be made to feel the importance of the subject? To this I would say there is but one sure and proper way, and that is to educate our people up to it. This is the way in which we have acquired all the knowledge that we do possess, and must acquire what still remains to be added.

The sciences take their birth, no man knows where, somewhere in the depth of the human soul. Their growth is commonly slow, they develop in the hands of the few, and often in the most humble and insignificant habitations. For years man is ignorant even of their existence, but as time rolls on the time will come when they can no longer be concealed, and we begin to comprehend that a new star has made its appearance on the firmament of human knowledge. Its lights may at first be faint and indistinct, but as it comes nearer it grows brighter, and as it is the pride of our nation to add another star to its banner on the admission of a new state, so will also this star be put down on the chart and admitted into the temples of human knowledge, from where it will cast its light over the people of the land.

Now entomology is such a science. It is commonly not recognized

as such at our universities and colleges, but is treated only as a small part of general zoology. There are very few of our institutes where entomology has yet been recognized as a distinct subject of study, or where even the first principles of the subject are taught. I am confident that I do not claim too much when I say that entomology is a subject as distinct as any other of the natural sciences. It has a light of its own. It is a field that will never be recognized nor properly cultivated as long as it is only a part of general zoology. Let, therefore, our higher institutes of learning first recognize entomology as a distinct subject of study. It is their privilege and duty to do so. Let it receive its place along side with the other natural sciences, and its care put in the hands of a proper and qualified person. The time will then soon come when it will no longer be in the hands of a few, but as it will gradually widen out under the fostering care of such institutes, it will soon come to include not only our colleges and academies, but in due time also our common schools. When thus the first principles of entomology will be taught in our schools and as much attention given to this as to kindred subjects, will this great indifference under which we now labor gradually die out, and our people will have learned not only to know but to feel the importance of entomology.

This has been the case with botany. As a science it has developed far in advance of entomology, and has now for years been recognized at all our institutes of learning, and been in the hands of qualified persons. The interest for the study has continually been on the increase, until at present it includes not only our colleges, but also a good part of our common school system, and we have such a delightful book as Gray's first lessons in botany to put in the hands of the children, which has already begun to be loved so much by the children of our country. What the benefit of this study has been and will be to our people it is not for me here to state. It will be enough to say that entomology will not stand back of botany in this respect.

ENTOMOLOGY AND HORTICULTURE.

If I do not misjudge, I think that you as a horticultural society are under somewhat the same condition of things. What is the greatest difficulty that you have had to contend with as such a society to reach the high aim you have before you, and for which you have worked with so much success and energy? Is it not that the general opinion has been against you, and that there is yet too much of indifference among our people on the subject?

We are aware that not many years ago the general opinion was that no fruit at all could be grown with success in Minnesota, and he who dared to differ from this was laughed at and considered to be very short-sighted. Since that time your Society has come to the front, and it has been proven repeatedly that fruit can be grown, and that with profit in our State. But still the general feeling is too much of indifference on the subject, and the industry remains in the hands of a few. It is not until you have removed this indifference and our people have been educated up to recognize and to feel the importance of horticulture that we will derive the full benefit that is to be derived from it.

I might put before you some of the benefits that are to be derived from the study of entomology, as they are many, practical and important. But I shall stop right here and only ask that you will continue to recognize entomology as an important subject for your Society, and give it that attention and sympathy that it at present needs. The time should soon come when entomology will be recognized not only at our State University, and especially at our College of Agriculture, but also by all the other colleges and schools of the State. There is also room for the State, as such, to recognize the practical importance of entomology, by the appointment of a State entomologist as many of the states have already done, besides the work which is now being done by the geological and natural history survey of the State, which is distinct.

Entomology has been slow to develop, but at last it has come to the front and stands before us to-day as a science that stands back of none of its associates in extent, in completeness, in beauty, in importance, and in the benefits that are to be derived from its study by man in almost every department of life.

Mr. Harris, from the Committee on Entomology, presented the following:

REPORT OF COMMITTEE ON ENTOMOLOGY.

Mr. President and Gentlemen of the Minnesota State Horticultural Society:

You cannot reasonably expect a very elaborate report from me, because I am not a scientist or even greatly learned in the science of entomology. But like yourselves I have been frequently victimized by

injurious insect pests and have observed them enough so that I can distinguish some of them when I see them.

My observations have been mostly confined to Southeastern Minnesota. I am very glad to be able to report that within the limits of my observation but very little injury was done our fruit by the larvæ of the codling moth. Our apples were fair and very free from worms. I think this a hopeful sign that some parasite has appeared to prey upon the insect, or that some new bird may have adopted the pupa chrysalides or the perfect insect as an article of food. This condition of things was very unexpected, as usually in years of short crop they generally utilize the whole of it for the purpose of propagating their species.

I have also noticed that upon my place the curculio or apple gouger were not nearly as great as in the three or four years preceding. That might be owing to the presence of greater numbers of birds than usual early in the season, or to the fact that my wife has for two or three years indulged in the expensive luxury of raising turkeys.

Neither have I observed the tent caterpillar to be as numerous as during the preceding year, when almost every variety of tree and shrub was badly infested with it, and young forest trees seriously damaged from being defoliated by it.

The grapevine flea beetle was not nearly as injurious as common. Early in May, or about the time our apple trees were in blossom, I noticed what I suppose to be the leaf-roller or leaf crumpler in great abundance, both upon the bearing and upon the small trees. These caterpillars were of a pale greenish color and at first appeared to curl up and fasten together the small leaves as soon as formed and feed within them; and in this way they appeared to do considerable damage to the smaller trees and root grafts. They did not appear to last more than three or four weeks, but in that time they kept the trees nearly defoliated and in a bad condition to make a strong growth during the dry season that followed. I could not discover that birds molested them, as they were just as numerous upon trees where they had built their nests. At the time, I had not leisure for studying them up or trying any experiments as remedies. At about the same time, or a few days later, the canker worm made its appearance in much greater numbers than we have ever before known them. These could be easily distinguished from the others, as at first they eat small, round holes through the leaves, and towards the last eat nearly all the pulpy portions of the leaves away. They were what we usually term a span worm or looper, and, when full grown, where about an inch long, of a

blackish or brown color on the back, with a yellowish stripe on each side. They not only infested the apple trees, but also the plum and some kinds of shrubbery. Scarcely any of the maybeetle — the larvæ of which is the white grub, so injurious to the strawberry beds and grass plats — were seen flying this year; but the two-year old larvæ, that is now in the ground, were rather more destructive than the average of seasons.

I found an insect of Plantbury family upon the young twigs of the plum; they were apparently feeding upon the juices of the twigs, and wherever one was found the leaves and end of the twig above had turned black and appeared as if blighted. I have sometimes seen a nearly allied specie upon the blighting twigs of the apple.

Aphides, or plant lice, were very plentiful and in many cases injurious. I had a half acre of Lima beans that were nearly ruined by them. They were so numerous that no fruit set, or did the plants make any perceptible growth for about three weeks. The points of the vines and the blossoms were thickly covered with them. I purchased a pound of Dalmation powder and gun, and commenced applying it as an experiment. I soon noticed a variety of the lady bug upon every plant, so after going over about forty hills I concluded that to save the beans at the risk of destroying the lives of so many friendly insects might prove to be an unfortunate speculation. The result proved to be a war of races in which the bug came out ahead. In a short time the aphides disappeared and the bean commenced thriving, although so late that they did not mature their fruit.

Before closing this report I wish to allude to two insects that are doing an immense amount of damage out in our prairie counties, the cottonwood tree beetle and the willow worm. These insects are increasing so rapidly and committing such depredations that it is only a matter of a very short time before these valuable pioneer trees can no longer be grown unless some remedy is found for them. I would suggest that our agricultural department of the State University enter upon an investigation of these destructive pests, and try and aid our prairie farmers to head them off. This is a line of work that calls for immediate attention.

DISCUSSION.

Mr. Gibbs. Knowing as I do that what is said at these meetings is for the benefit of the large number of people that read the reports, and as I am glad to see the annual increase in the number of such

readers, and considering the vast importance of this subject of entomology, in the interest of agriculture and horticulture, it seems to me Mr. President, we can afford to take a little time to place some additional matters upon the record.

And first, in answer to the question of Prof. Oestlund of how to excite a deeper and wider interest in this State on the subject of entomology, that it may be recognized as proper to be made a study in our public schools. The first answer I would make is this, let the specialists in this science carry on their studies, hand in hand with other investigations. As they proceed in the study of insects let them give the public information as to those that are friends to the farmer and horticulturist as well as to his enemies, the means for the destruction of injurious insects, giving warning of approaching foes when discovered.

I have no doubt in my own mind that entomologists could have greatly lessened the ravages of the chintz bug; but what chance was there for them to do it? They could get no audience in the State if they spoke upon the subject; farmers did not realize its importance or pay any attention to it. But why cannot entomology, ornithology and forestry be considered together with reference to these subjects? Let them do all they can to educate the people to the value and usefulness of birds, and warn farmers of the ruinous practice that prevails of encouraging the shotgun all over these prairies, thus destroying the few friends of man that are placed here to keep these insect enemies in check.

A simple illustration will make the matter clear to any reader. In my own neighborhood in Ramsey county, Dakota, there is a very nice man, a friend of mine, who has a family of boys nearly all grown to manhood, and from the father down everyone of them has a shotgun, and their house is full of ducks; and every moment of leisure time they get they are out over those prairies shooting everything that wears feathers. [Laughter.] I don't believe a plover would dare to venture within two miles of that house; and that farmer was the one to complain most of the damage done by insects.

It is admitted I believe there are some four hundred millions of dollars worth of property destroyed annually in the United States by insects. At the same time I do not believe there is a single destructive insect whose ravages could not be prevented or at least greatly lessened by a simple observance of the laws of nature in regard to them.

Insects are rapidly increasing in numbers. We must look to these professors of entomology, to these scholars who are familiar with or-

nithology and to these experts in forestry for instruction in these matters, to lead on bravely in the work of education in these matters Agriculture will soon become impossible unless the importance of entomology is recognized and the people are educated upon these matters. As said by the professor the knowledge of this subject is not carried beyond the few specialists who now take it in charge.

I believe the terrible devastation of crops in Minnesota from chintz bugs has been due simply to the encouragement of the shotgun on the prairies. I have sometimes wished I had the power of the emperor of Russia, that I could banish every shotgun in the land.

Mr. Pearce. Mr. President, I agree with friend Gibbs. I will go still further; I believe our legislature are enacting laws that are working destruction to the State in permitting the killing of our prairie chickens. If they were suffered to live, I doubt if we would have suffered seriously from the chintz bugs.

There is a bounty on the pocket gopher, one of the best friends we have. If I had ten thousand on my place, I wouldn't kill them. [Laughter.] You may say they eat grain. Very little; they eat bugs and all kinds of insects. I have worked among striped gophers where there were thousands of them. A little corn sprinkled around the field will prevent their taking up the growing crop. I have seen them fight over the pile of corn placed out for them to eat. With a peck of wheat you can protect twenty acres of corn. Protect these little animals; encourage them; they are the best friends we have. I never kill one of them, not even a skunk. If we would stop killing these little animals, we would hear less talk of the destruction of our crops.

Mr. Harris. I am glad Mr. Pearce corrected himself by saying he was a friend to the striped gopher, although the pocket gopher was put here for a purpose and has given us a soil that beats the world. I have been condemned for considering the pocket gopher more beneficial than injurious, but I still think there is no animal more useful, unless it is the common skunk. It is useful in destroying the larvæ of the maybeetle. I think so much of it, I have two specimens mounted and placed where I can see them.

There is one bird I think a good deal of, known as the crossbeak. It is really fascinating to sit down and watch it bring the beetles to its nest to feed its young. Last summer I was afraid I would lose my patch of potatoes, but I soon noticed the birds were taking the bugs, and I only lost a few hills in the whole patch. I have not used Paris green for fear of destroying as many of our friends as of our foes. I believe if we understood entomology more thoroughly it would be of

great advantage. I discovered two or three years ago, when our apple trees were infested with aphids, that the lady bugs destroyed them and protected the trees. There is nothing more interesting to children than "bugology" when they once get started in it, and I hope the rising generation will be taught in the science.

Mr. Wilcox. I would like to inquire if the curculio ever prevails on wild plums?

Mr. Harris. I have seen them, but if the plums are thrifty the sap seems to drown a large portion of them and the plum comes to maturity.

Mr. Wilcox. I notice a good deal of apprehension exists among farmers with regard to chintz bugs. I do not apprehend much injury will result from their ravages another season. They are not apt to develop except in dry seasons, and it is stated that three dry seasons in succession is very rare.

Mr. Harris. Chintz bugs are found in large numbers where rubbish is allowed to accumulate; they deposit their eggs, and if the season is dry they are ready to continue their work. If our birds were spared, we would not have so much loss from insects.

Mr. Gibbs. I referred a while ago to the necessity of forestry. I do not think there is an instance known where grasshoppers have crossed over any large body of timber in their migrations. If the government had retained these lands in their own hands till they were reforested, that work could have been accomplished at less expense than the amount of damage done by grasshoppers in their invasions.

President Elliot. I think you are in error in that. We had large quantities of them that came over the timber; they were here but two or three times, but the air was full of them.

Mr. Gibbs. They did not get far from the timber, did they?

President Elliot. They extended over a good deal of territory.

Mr. Gibbs. Prof. Riley in his investigations arrived at the conclusion that grasshoppers were limited in their travels east by the condition of the air. He indicated boundaries beyond which they would not be likely to pass, and the grasshoppers disappeared substantially on the line that he indicated. It may be stated that a large body of timber so affects the moisture of the air that it appears to be quite an effectual barrier to their extension.

Mr. Gould thought timber had a marked effect in preventing raids of grasshoppers. They did very little damage, except in few instances, this side of the timber known as the Big Woods. He was here at the time of their visitation in 1857; they came in August of that year, de-

posited their eggs and reappeared the following season. They did little damage and soon disappeared. At the time of their last visitation they remained a period of five or six years and caused an almost total destruction of crops. In Kandiyohi county, where crops were almost totally destroyed, there was little timber, while in this vicinity there was very little loss. This indicated that timber proved an effectual barrier to their eastward march.

The last on the program for the evening was a paper by Prof. Pendergast.

EXPERIENCE IN ORCHARDING IN MINNESOTA.

By Prof. W. W. Pendergast, Hutchinson.

In the spring of 1856 I had one hundred two-year old apple trees of the standard sorts,—Greenings, Northern Spys, Baldwins, etc.,—sent me from Dimond's nursery in Stratham, N. H. They were planted in a poplar clearing in front of my house in Hutchinson. On account of lack of suitable ground they were set only two feet apart. Nearly all lived and made a satisfactory growth the first season. The winter following was one of the most severe ever known in Minnesota, but the snow was deep and that protected and saved the lower half of the trees. Every twig that projected above the snow line was killed, and some were dead to the ground. In the spring the dead wood was all cut away and the trees were left to grow as nature willed. The next winter there was not much snow, but the trees had grown bushy causing a small drift around them, and the result was about the same as the year before. Some of them lived along at this "poor dying rate" till the Sioux Indians in 1862 burned the house, and the whole place went back to primeval desolation. Thus ended my first and only attempt at fruit raising in the Territory of Minnesota.

In 1866, having satisfied myself that Transcendents and Hyslops had certainly been grown in this State, I bought one hundred yearlings and one dozen three-year olds of each kind, together with a few Duchess and Siberian crabs of an agent from Anoka by the name of VanValkenberg. With the exception of the Duchess all thrived well. In three years the larger ones commenced bearing, the Transcendents and crabs yielding astonishing crops till 1878, when the Hyslops and Red Siberians began to die. From the first they had not shown as much vigor as the Transcendents, which up to this time appeared to be iron-clad. It was not long, however, before they too

showed signs of discouragement, and an inclination to give up the struggle for existence. Each returning spring showed fewer living trees, and those in worse condition. There are now perhaps a dozen of them "cumbering the ground," but their days of usefulness are past. They blossom well but the apples are like angel's visits. A word about the Yellow Siberian. They have always been at home, have made a vigorous growth every year and are now between thirty and forty feet in height with trunk two and one-half feet in circumference. These trees were set in a rich black loam ten to twelve inches deep, underlaid with coarse gravel, and then sand to an unknown depth.

For the first few years my orchard promised so well that I was tempted to venture too far. In 1873 I exchanged eighty acres of land in Sherburne county with Shearman, a nursery man of Rockford, Ill., for apple trees. This gave me 32,000 root grafts and 1,000 two-year-olds of most of the kinds recommended for trial by the Minnesota Horticultural Society. Nearly all of these I planted myself, nursing and caring for them till most of them died a natural death. The kinds were Transcendent, Hyslop, Duchess, Red and White Astrachan, Tetofsky, Fameuse and others. Of these probably 500 Transcendents and half a dozen Hyslops are alive to-day, most of the Transcendents in fair condition. Three or four Duchess trees, planted on the north side of the house and within three feet of it, look bright and sound from the ground to the topmost branches, but they do not bear a peck of apples a year. Probably they are in too cool and shady a place. So it seems that the conditions essential to healthy growth are decidedly unfavorable to fruit-bearing.

Out of several hundred seedlings which I have raised, all are now dead but three. These are about fifteen years old and apparently as hardy as the Siberians. Transcendents, Hyslops, Early Strawberries, Orions, Hebrons, and all the so-called iron-clads have been winter-killed around them, but these are all as sound as oaks. One is a seedling of the Duchess and the other two sprung from the original stock when the root grafts died. Hardiness however is their only good quality. The fruit, though considerably larger than the Siberian, is scarcely better than that of the Hyslop, and that is placing it low enough. The fact that by years of experimenting we can make some improvement in quality and still retain the absolute *hardiness* of the crab is encouraging. Others have done very much better than I have, and the end is not yet. Every year will add its quota, and in the "good time coming" some one will give us an apple as good as the Wealthy and as hardy as the Yellow Siberian.

SMALL FRUITS.

Red Dutch currants are a success wherever I have set them, and yield bountifully whenever the season is not too dry. Other kinds have not proved so satisfactory, though the fruit is larger.

Gooseberries—American Cluster and Houghton's seedling yield enormously about two seasons out of three. The currant worms trouble them however much more than they do currants.

Raspberries and strawberries demand a moister soil than they find in my garden. Outside of the level tract with the gravel subsoil above described, with a little winter protection, they give fairly satisfactory results.

Grapes have proved a failure on the gravelly land, but do well in the woods and on the south side of lakes. I have about two hundred vines on my farm where the subsoil is clay. These are just beginning to bear and the promise for the future is most flattering.

On motion the meeting adjourned till Friday morning.

MORNING SESSION.

FOURTH DAY, FRIDAY, JAN. 20, 1888.

The meeting was called to order at 9 o'clock by President Elliot.

PRIZE ESSAYS.

Mr. Pearce, from the Committee on Prize Essays on Grape Growing in Minnesota, presented the following:

Your committee on the best essay on Grape Growing report that there is one essay competing for the prize, by R. A. Latham, of Excelsior, aged nineteen years, and who is entitled to the prize.

M. PEARCE,	} Committee.
E. H. S. DARTT,	
J. M. UNDERWOOD.	

GRAPE-GROWING IN MINNESOTA.

By R. A. Latham, Excelsior, Minn.

LOCATION.

In the selection of a location for a vineyard a place should be chosen in a neighborhood where vine growing is already known to be a success. The place selected should be if possible a south or east

slope. High ground on the south shore of a lake or on the banks of a river, to prevent the late frosts of spring and the early frosts of fall, is preferable. Almost any slope will answer though to plant vines on if it is well sheltered. If there is not a natural shelter near the place selected one should be provided.

SOIL.

Any soil that will raise good corn or potatoes will do for a vineyard, but preference should be given to that which is not too sandy and is underlaid with yellow clay containing fine lime stones in abundance. In such a soil vines will be healthier and less liable to winter-kill.

LAYING OUT.

In laying out the ground the rows should be about eight feet apart running horizontally around the slope so as to prevent the hill from washing. For convenience sake it is better to leave alleys 11 feet wide running up and down the hill about every 150 or 200 feet apart, making it easier to tend the grapes, as will be explained farther on. The vines should be planted from six to eight feet apart in the rows, depending upon the strength of the variety.

VARIETIES.

The varieties that are planted in the largest amount are the Delaware and Concord; but Moore's Early, which is a large dark purple grape, and ripens early, and the Pocklington, a large white grape with a very fine flavor, and a number of other varieties are growing in favor.

PLANTING.

In planting, the holes should be dug slanting and from ten to twelve inches in depth and the width of a spade. It is best not to dig very many holes in advance of the planting as they will dry out. The earth in the holes should be well pulverized.

While planting is going on the vines should be kept where they will not dry out. Young vines one or two years old that have been raised from cuttings in a nursery should be used in planting a vineyard.

The roots should be trimmed back before planting so that when they are put in the holes they may have their natural position, and it would be better if the hole is deep enough and slants sufficiently to

bury a part of the top also. Good rich dirt should be put next the roots and pressed firmly around them with the foot. The vines should all slant in the same direction so they can all be trained on the trellis in the same way. The accompanying cut

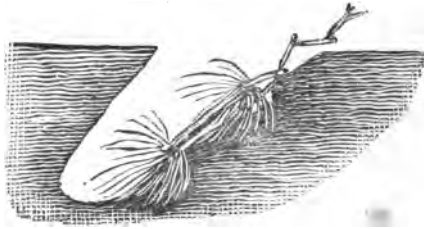


FIG. 1.

(Fig. 1) shows the shape of the hole and the vine therein ready for covering with soil.

FIRST YEAR.

There is not much to be done the first year except cultivate and keep the weeds out of the vineyard. A crop of some kind can be planted among the vines, such as corn or potatoes that can be cultivated. In the fall select the best cane and prune it back to about six inches in length, and cut all other growth away entirely. This cane should then be bent down and covered with dirt three or four inches deep and then with straw two or three inches. Finally plow three or four inches deep throwing the furrow toward the vines. No fruit should be allowed on the vines this year.

SECOND YEAR.

The vines should be uncovered about the first of May; but if the weather is warm before that time, they should be examined, and if the buds show signs of starting, they should be taken up at once. After the vines are taken up the earth should be removed three or four inches deep from around the base of the vine, and all the roots that are near the surface should be cut away.

This root pruning should be repeated every other year. The ground should be plowed again, throwing the dirt away from the vines. After this stakes six feet long should be set at each vine to train the young shoot to. All the new shoots should be pinched off except the strongest, and that should be allowed to grow till late in July, when it should be stopped by pinching off the end.

The laterals (that is, the shoot that grows from the base of each leaf) should be pinched off, leaving only one leaf; and when another lateral grows from the base of this leaf, it should be pinched off in the same way; and so on throughout the growing season.



FIG. 2.



FIG. 3.

Fig. 2 shows the process of pinching or trimming the laterals. Unless extra nice bunches are wanted, the second pinching will generally be sufficient. The ground should be cultivated thoroughly during the summer. In the fall the vines should be pruned back, leaving about two-thirds of its length, and prune off all the laterals. A bunch or two of fruit may be ripened this year without harm.

THIRD YEAR.

In the spring of the third year the vineyard should be trellised. This can be done best before the vines are uncovered. The posts should be seven feet long, so that when they are set in the ground they will be five feet above and two feet under ground. They should be driven in twelve or sixteen feet apart. Four wires are required for a first-class trellis. The lowest wire should be placed eighteen inches from the ground and the others fourteen inches apart. The size of wire to use is No. 12 galvanized. The wire should be fastened to the posts with staples, leaving room for it to play, so that it can be tightened in the spring. After the trellis is finished the vines may be taken up and tied to the lower wire, all being trained in the same direction. The string used by many for this purpose is bag twine; it comes in packages of about ten pounds. Care should be taken not to tie the vines so tightly to the wire as to stop the free circulation of the sap and thus impair the growth. The vineyard should then be plowed, throwing the dirt from the vines, and spaded under the wires three or four inches deep with a pronged spade. When the shoots have grown from four to six inches, so that the difference in their vigor of growth can be seen, then thin them out, saving the strongest and not allowing them to grow nearer together than six to ten inches. As a rule, two shoots should not be allowed to grow from the same bud. When they have grown long enough to reach, they should be tied to the next wire. The laterals growing from the new shoots should be pinched off the same as the direction for the previous year. When the new shoots have grown to the top wire, they should be pinched off at the extremity.

The vineyard should be cultivated and hoed frequently throughout

the summer. In the fall the vines should be pruned by cutting these new shoots off an inch above the second bud from the base. This will leave spurs of two buds from six to ten inches apart. As the vine does not yet cover the entire space on the trellis, it should be extended to do so another year, and a strong shoot should be selected growing near the end of the vine and pruned long enough to reach to the next vine.

In covering the vine this season a little dirt should be taken from under the base of the vine on the side towards which it is to be bent down and a little ditch made about two inches deep the full length of the vine in which it can be laid. It should then be covered and plowed the same as before. Considerable labor can be saved in covering by putting earth enough on the vines with a spade to hold them down, and then throwing a furrow with a large plow, having a long mouldboard, upon the row from each side, being careful not to go deep enough to cut the roots.

Plowing spring and fall as directed with a light plow prevents the accumulation of roots near the surface, which is, in many ways a great benefit to the vines. Fig. 3 shows the vine after it has been pruned at the end of the third year. The vine may ripen three or four pounds of fruit this year, but beware of overloading.

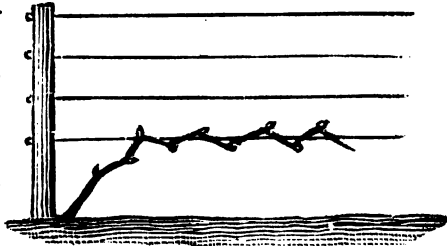


FIG. 4.

FOURTH YEAR.

Before the vines are taken out this year the trellis should be examined, and the wires tightened. The vines should be tied the same as the year before, extending the vine to fill the trellis to the next vine, by tying to the lower wire the cane pruned the fall before for that purpose. In thinning this year two shoots should be left on each spur, selecting the strongest. All the rest should be broken off, and the new cane that was left to extend the vine should be thinned the same as per directions for the year before. When long enough the new shoots should be tied to the wire, and the laterals pinched off, and this should be continued throughout the growing season. The vines should not be neglected till they have grown long, but should be tied up and the laterals pinched as soon as they have grown enough to do so, as it is injurious to the vine to take off a large amount of foliage

at one time. When the shoots have reached the top wire they should be pinched off; the stems of green grass are used to tie the shoots; about five strands to one tie. In pruning this year spurs of two buds each should be left the whole length of the vine at a distance of six or ten inches apart. In selecting spurs on the part of the vine where spurs were left last year, a shoot should be selected growing as near the main vine as possible and two buds left on it, and the old spur should be cut just above the new one. Fig. 4 represents the pruning of the spur this year. Cover the same as before explained. This year the vines may safely carry eight to ten pounds of fruit, and after this, as a mature vine, it should bear ten to fifteen pounds yearly; but look carefully to the thinning of the fruit in the early part of the season, to prevent crippling the vine by overbearing.

The after-training of the vines is substantially the same as given for the fourth year.

RENEWING.

In renewing the vine on account of a vacant place on it caused by the lack of shoots to make spurs, a strong shoot should be selected, to be tied to the lower wire in place of the old vine, and the old vine should be cut off just beyond the selected shoot. Spurs should be grown on this cane as directed for the third year.

GATHERING FRUIT.

When enough fruit has been ripened, the vineyard should be gone over and the ripe fruit gathered. Fruit should never be gathered that is not thoroughly ripe, as a grape raised in Minnesota that is not wholly ripe is sour and not fit to eat or market; so, in order to please the buyer and to obtain a ready sale and a good price, do not pick anything but ripe grapes. In picking grapes, care should be taken to handle the bunch as little as possible, as it will rub the bloom off the grape and injure the looks of it. The best basket to pick the grape in is the ten pound air-tight basket with a light cover. After the baskets have been filled, they may be brought to the alleys, covered and loaded. This is one use of the alley; the other is to facilitate the handling of straw in the fall.

COVERING OF MATURE VINES.

The vineyard should be covered with earth every fall, as before directed; but in heavy clay soils, after the vines become mature (about

the fifth or sixth year after planting), the covering of straw may be safely omitted. At this time the roots have acquired sufficient size and maturity, and have penetrated far enough into the ground to be able to withstand the cold; and the roots near the surface that would have killed have been kept down by the plow. In a lighter soil a greater amount of protection is required.

Mr. Pearce from the committee on Prize Essays on Orchardring in Minnesota presented the following:

Your committee on the best essay on Orchardring in Minnesota report that there were three essays submitted. One by Norton F. Brand of Faribault, aged 18 years; one by Edgar D. Sias of Minneapolis, aged 18 years; one by Edwin Deacon of Rochester, aged 26 years. As the latter was not within the requirements of the Society as to age there were but the first two considered, and the committee award the prize to Norton F. Brand.

M. PEARCE,
J. M. UNDERWOOD, } Committee.
E. H. S. DABIT.

ORCHARDING IN MINNESOTA.

By Norton F. Brand, Faribault.

Mr. President and Gentlemen of the State Horticultural Society:

Being freed from school by our recent vacation of two weeks, and seeing your offer for a prize essay on Orchardring, I thought it a good chance to make my vacation pay. I am an inhabitant of Rice county, outside of the most favorable localities for fruit growing. Ours is the third district for apple growing so far as natural advantages are concerned. I cannot boast of age, but have had some chances to learn, having been brought up in a nursery and orchard, and have had the benefit of experience for the most of my life, which began eighteen years past. I also have had many advantages in getting information from periodicals. We now take of papers that treat of the subject whereof I write, *The Farmer, Farm, Stock and Home, Western Rural, Prairie Farmer, New York Tribune*, and frequently obtain others. I am now glancing through a year of the *Country Gentleman*, in which I find some good items to sustain my strong points. We also have the

Horticultural Reports from the beginning of the Society, and some from other states of the Northwest.

To begin with, to make orcharding pay, take as many good papers as you can afford to, and keep informed on your business. Don't leave out your State's papers on this subject. To get an orchard up to bearing size in such a way as to profit by it after it begins to bear, is the greater part of the work, so the most of this paper will be devoted to that branch of the subject.

LOCATION.

First. Select your site. Anything is better than sand. The best soil, however, for our hardy apple trees, is a deep loam or porous clay subsoil, a subsoil composed of yellow, red or blue clay, mixed with either large or small limestone is one of the best. But as you already have your land on which you are to plant and cannot escape using such as you have, you can perhaps better its condition. If the subsoil be sandy or gravelly, dig a hole one foot deep and three to six across, for each tree, and fill with rich loam and clay marl. If old boots, shoes or bones be handy, cast them into the hole. Bones contain much lime, either phosphate or carbonate, and both are important to plant life and growth. Lime is a large constituent of the bark of apple trees. If your subsoil be a cold, retentive blue clay, that will hold water and not more than three feet beneath the surface, you must plow it in such manner as to get about four feet of good soil above the clay, with a drain four to five feet below the surface. This drain may be constructed by plowing from the place where the drain is wanted, two or three times, then sink your plow down in the dead furrow as deep as possible for two or three bouts. Shovel out the earth loosened in the bottom of the dead furrow, then dig a trench one spade wide. You will now find yourself from four to five feet below your land surface; fill the trench with broken stone and gravel. These drains should be twenty-five feet apart. If preferred, tile can be used instead. Remember this, however. So prepare the ground that the tree will get four feet at least of good, friable soil, above the underlying clay. Now sow broadcast manure, lime and ashes. The drains should have descent sufficient to prevent standing water. Now plow towards the drain three or four times, making a ridge over it on which the trees are to be planted. I have now described what I hold the best preparation of ground for our two poorest fruit-tree soils.

Next if your soil be a dry, clay ridge, or a timbered ridge, make a large hole and fill as for sandy land. If a good loam soil on porous

clay subsoil, deep plowing and harrowing will be all the preparation required. If the surface soil be sandy, on clay subsoil, prepare as for gravelly subsoil; and in after cultivation add fertile loam with manures to the surface.

Don't be afraid of wet soil, if it be underlaid with a porous, limestone clay subsoil. Some of our best Duchess are where we can get water within four or five feet, and they bear our largest and best colored apples. The extreme dryness of our climate requires that the tree get a very large amount of its moisture from the soil.

Prof. Budd says that in some of the dry localities of Russia fruit growers water their orchard by a system of irrigation. This last Autumn my father visited the oldest orchard in the Northwest, that at St. Joseph, Mich. He tells me that the trees are 109 years old, and are still producing good crops. About all left of this orchard is the lower row of trees—near the water, and only four or five feet above the St. Joe river at low water mark. They have been submerged at times to a depth of eight feet.

Again, in our neighborhood, in 1884-5, Duchess on sandy clay, and gravelly subsoil were nearly all killed. But none were killed or even seriously injured on moist clay subsoils.

To further sustain my position I will introduce to you some of the experienced writers of the *Country Gentleman*. One who signs himself D. S. B., from Washington county, New York, says: "I am led to believe that the cause of the death of many trees is too little moisture in the soil during the severe winters. Lands long cultivated in the usual manner become incapacitated for retaining moisture as they formerly did, and in some way this affects the tree in cold weather. * * * Even in our wood lands after a dry autumn and severe winter many trees die wholly or in part, the following spring and summer. Fifty years ago our best orchards were on our driest hills; now they are on our cooler moist loams and slate hollows, and yet we see seedling trees growing and bearing abundantly in the fence corners, and depressions on dry hills where snow drifts accumulate in winter, and where the soil is always more moist. * * * One orchard of two hundred trees set eighty years ago on broken land—are all dead, but those on the lowest, moistest soil, and these bear in spite of a half century of neglect."

B. F. Johnson, Champaign, Ill., says: "Try the experiment of giving a few fruit trees the benefit of a thorough wetting of the roots before the winter sets in. The advantages are: a soil saturated with water does not freeze so hard, or the frost injure the roots of trees as

much, as a soil that is dry." Mr. Johnson mentions experiments that he has made, watering trees Autumn and Spring with wonderful results, and adds: "Few persons recognize the fact that the roots of the pear and apple love water (but not standing water) almost as much and as well as the orange." He mentions pear trees in Colorado large and healthy in earth so saturated with water as to kill the grass. Speaking of the enormous crops of apples on Duchess and Wealthy in Colorado, he adds: "The essential element of success here was water — an abundance of water — and wet feet from April to October." In another article on an orchard in his own county, he says: "Of an orchard planted between fifty and sixty years ago I observed three or four apple trees remarkable for their size and vigor and laden with fair, smooth and (for their quantity) large-sized fruit. Curiosity being excited, a closer inspection was made and it was found that each one of these trees had one or more hog-wallows under it. The site of the orchard was originally moist, if not wet, and close to the creek's bank. If the largest and most valuable of our timber trees grow best in a soil wet six months of the year, and moist twelve, why not the apple?"

In further support of my position I refer you to a report in your last volume of transactions, in which mention is made of an orchard of three hundred trees in Northeastern Iowa, set in 1865, and described as follows: "Many of the trees are from ten to fifteen inches in diameter and twenty to thirty feet in height. * * * The soil a rich black muck and so saturated with moisture that the lower edge of the orchard is a springy bog."

In the *Gardeners Monthly* of 1884 I read: "It is well known that trees endure a much lower temperature in moist atmospheres than in dry ones."

Our esteemed friend Mr. Harris has always advised rich, moist land for an orchard site. Facts are what count. I have given the facts.

The old Wolf River is growing where its roots were in water at certain seasons. An old seedling mentioned by E. Wilcox, of Trempealeau, which once bore twenty bushels in a year, stands on low ground, near a marsh.

If you have no water near your orchard site, and have slopes or hill-sides, if the soil be all alike, the northern slope will contain the most moisture, and on that account be best for the ordinary farmer, who is apt to neglect it too much. A north slope with high, thick timber at the north end is not so good as where the orchard does not extend to

the bottom of the slope, leaving a long, open descent below, thus affording a free circulation of air to the orchard.

Let us emphasize the fact that all kinds of trees grow very much alike on all kinds of slopes, all other things being equal, such as soil, protection from wind, sun, fire, etc.

VARIETIES.

Having got ready to plant, if for profit and you live west of a line running between Lake Pepin and Rochester, take my advice and of the varieties of apples now to be had plant nothing but the Duchess of Oldenburgh; when you are able to get the Itasca and Peerless, plant them. If you plant for home consumption, plant five Tetofskys, twice as many Duchess, five Wealthy, and of crabs and hybrids two Early Strawberrys, five Transcendents, five Whitneys and three Meader's Winter. These are the three best apples and four best crabs of thoroughly tested varieties. There are other hardy crabs, but bearing so little as to be unprofitable. The Tetofsky will not bear much, but are early and good. The Wealthy will bear considerable fruit, if cared for as I am about to direct.

PLANTING.

Secure sound trees not exceeding three years of age and with good roots. A tree grown in Minnesota one Summer from the graft, cut back to the ground next Spring, making a growth of three and a half feet that Summer, healed in the ground that Autumn, is a good tree to plant; or a well-grown, perfectly sound tree two or three years old and having no scars on its body where limbs have been trimmed off. See that the bark be perfect. Be sure you buy of a Minnesota nurseryman, and one that does not pretend to be doing an immense business. He may be doing so much that he knows nothing of your little order and trusts it to Tom, Dick or Ole to fill.

If you plant to raise apples to sell, either plant root grafts, three grafts eight inches apart where your tree is wanted, or else buy selected one or two year old trees. Be sure they are dug in the autumn. A tree that stands out through a Minnesota winter, except it be a winter like 1887-8, is not fit to be transplanted in the spring. To get your trees home safe be sure that they are well wrapped up root and branch as soon as they come into your hands; secure them from wind, frost, and sun; keep the roots moist until they are planted; see that the bark and roots be not bruised in any manner, for in our rig-

orous climate a little bruise will work much damage to a tree. Should there be any bruised cover with wax, the preparation of which I will mention further on.

In planting apple trees plant early in the spring, as soon as places can be dug for the roots. It is very important that the tree should get a good healthy growth the first year, so that it may start life with a good reputation. This is as necessary to a tree as to a man. If the top makes a good growth the root will also. Plant early so that the ground will be settled and the roots ready to lay hold of the ground at the first opportunity. Unless the soil is wet by recent rains use plenty of water, so that the soil will be so thoroughly wet that the earth will settle around every fibrous root. One advantage in the use of water is that the soil settles immediately, without waiting for rains which may be long delayed.

Plant each tree so that the top of the root will be about six or eight inches below the level after the loose earth settles. In light soil, 10 to 12 inches. Frost and air penetrate sandy soil deeper than heavy soil, and the mechanical action of air with frost is very injurious to the roots of trees in dry soil. Set each tree leaning slightly toward the 2 o'clock sun. If you use water in planting do not fill the hole quite full of earth. The next day fill in with soil without water and press it down firmly. Then throw about three inches of loose soil on top. The roots of each tree should be straightened to their natural position; the ends of each bruised root be cut smooth with a sharp knife. Nothing but well pulverized soil and water should be used in planting the tree. If the tree has branches place the longest and heaviest branch to the southwest side of the tree; keeping in mind that the top of the future tree must be more than half on the south side of the trunk. The tendency of a tree in this climate is to grow toward the northeast, and you will be obliged to keep a sharp lookout every year in order to direct the growth of the tree's center and south limbs, by cutting back the north limbs. It will be sometimes necessary to drive a stake and tie the leader and largest south limb to it, in order that it may be started in the right direction. Remember, that strict attention to these little things is often the dividing line between success and failure.

Why do we wish the tree trained toward the southwest? Because the unbroken rays of the sun shining on the body and forks of the tree is one of the most injurious things that can happen to it. And the easiest and cheapest way to prevent it is by making the top low and thick on that side. Five minutes work on each tree now spent in

shaping the top will save a great amount of labor in setting up boards or constructing other protection during the ensuing fifteen years. A stitch in time saves nine applies with ten-fold force in this place. Shape the top low, three feet is high enough, trim every year for four or five years in June, then you will cut only wood of the same years' growth and leave no wounds.

PROTECTION.

Plant trees, if Duchess, sixteen feet apart, north and south, and twenty to twenty-five feet apart the other way. Cultivate the ground often during the early part of the season, stirring the soil to a depth of six inches until the twentieth of June or first of July, then mulch with refuse hay, straw, cornstalks or like material. This should be spread about the tree to a distance of four feet from the trunk to keep the ground cool and to keep down weeds. The object is to make the trees grow all they will during the first part of the season. If the soil is not in good condition add well rotted manure in late autumn as a mulch. Ashes strewn broadcast over the ground in early spring will be very beneficial.

The first and second autumns after planting remove mulch from contact with the tree, throw a mound of clear earth not less than six inches high around each tree. Then wrap the body up with rye straw, cornstalks or gunny sacks. And let it remain on till the last of April. This is to keep the sun from injuring the bark during the winter and spring; and it is all important in keeping the heart of the tree sound. Every autumn thereafter until the top shades the body set up boards in September to keep sunlight from reaching the body of the trees, or when you wish to give the tree especial care put on bark from poles peeled in May or June. For this purpose use poplar, elm, butternut or white birch. Fasten this on and leave it until the next May. Now do not plant an apple tree unless you are willing to do this. If you neglect to do so until the top is large enough to shade the trunk, the south side will be injured. Then there can be but little growth on that side, and the top will incline toward the northeast and give still better opportunity for injury from the sun. Few think it is the heat of the sun which kills our trees off, but it is to a large extent. My father informs me that he saw in 1873 a number of pear trees protected from the sun on the previous winters, and that came through all right, while those exposed to the sun were killed. Of course they would not have been killed if the cold had not been extreme, and on the other

hand the others would have been killed if the sun had shone on them.

It is my opinion that the sun injures the bark and cold injures the wood of a tree. We have many trees shaded by evergreens, the wood of which was entirely killed by the winter of 1884-5, but their bark is as green and healthy as ever.

Here let me refer to an article in the *Farmer*, of Oct. 21, 1886, by C. Gaylord. He says: "Our Fameuse are all dead, or nearly dead, except one. This now appears in fair condition. This I attribute to the tree being set close on the north side of a picket fence some twelve feet high. It has strong, hardy roots, properly grown from the stem of the tree." The article was written on "Fruit Trees on Their Own Roots."

In reply to the same in the *Farmer*, Nov. 25, 1886, we read: "First. A fence twelve feet high affords considerable shade to the ground immediately north of it, which shade prevents the evaporation of moisture from the soil, and the trees standing in the shade of the fence had the necessary amount of moisture to enable it to withstand forty degrees or more below zero, inasmuch as the frost was taken out of the body of the tree while in the shade. Second. Had the fence been taken away before the south side, or any part of the tree had thawed after the intense cold of that winter and the frost had been taken out by the sun, the tree in question would have gone with its fellows, even had it been on a hardy root." The same writer, a Mr. Brewster, further says: "The second great factor in the killing of trees is a lack of sufficient moisture in the soil to enable the roots and leaves of the trees to properly perform their functions in storing up in sufficient quantities those elements which enable it to withstand extremes of heat and cold."

I think he takes a right stand. Sunshine in winter and spring, roots in dry soil, with the aid of cold, kill our trees. Cultivate the ground among the trees for four or five years. Raise small fruits (beans or potatoes), but not corn, since corn shuts out the wind and causes the intervening soil to become too hot. Add as much fertility to the land as the crops extract. Use short whiffletrees when cultivating or plowing, and never let a whiffletree touch a tree. Don't allow any kind of crop to grow within six feet of a tree, but stir the earth around the trees often, and five or six inches deep, for four or five years. The feeding roots will by this time have extended eight or ten feet in all directions, and cultivation must cease. A good mulch to a distance of five feet from the tree will now prevent growth about the tree and be better and cheaper than further cultivation.

FERTILIZERS.

Lime is one of the chemical elements of the apple tree, and unless your soil has it in abundance, it may need some by the time the trees begin to bear. Some soils, if very sandy, may need a pound of sulphur to each tree, sown broadcast with lime and harrowed into the soil, alkali being necessary to render the sulphur soluble. Crabs and Wealthys will be most benefited by its use. Iron scrapings from a foundry buried in the soil six to ten feet from a tree are also valuable. You don't know what your soil may lack. Bury dead animals four to five feet beneath the surface and not nearer the tree than six feet; provided the orchard is not above or near your well. Don't expect to get much fruit without adding fertility to the soil. If there is grass in the orchard, mow it and allow it to remain for mulch.

If you have apples for sale, pick by hand and take to market in baskets in a spring wagon if possible. Make poor apples and crabs into cider vinegar rather than try to sell them on a full market. If you have a large supply of Duchess on hand keep in an ice house till you have a market.

Farm, Stock and Home says: "Success in farming is the result of proper business methods." The same holds true of fruit growing.

Ours is a windy State, and apples are liable to be blown from the trees in summer. A windbreak is needed the nature of which will depend on the location of your orchard. In our city of Faribault our heavy winds in summer and autumn are from the west and south. If your location admits of it set two rows of European larch one hundred feet from your orchard. Twenty feet outside of them plant two or more rows of evergreens. Use Balsam Fir, White spruce, and White or Scotch pine. If you are in a very windy part of the State, plant two rows of white willows twenty feet apart ten rods from your orchard; inside of these fifty feet plant two to four rows of evergreens.

On account of the infinite variety of locations and slopes it is hard to lay down any arbitrary rule for protection; and the planter must fall back on his own good sense, if he has any, and adopt means to ends; ever keeping in mind that fruit trees need lots of air and room; the closest protection on level should be on the south side; and that drifting snow must be guarded against, by stopping it outside the orchard.

Last summer while canvassing west of the Big Woods I saw many orchards entirely ruined by the drifting of the previous winter.

Nothing but stumps left. This was because the windbreak was too close to the trees.

PROTECTION FROM RABBITS.

Rabbits are a fruitful source of annoyance to a young orchard. To protect the bodies of trees set laths or split staves around the bodies of the trees, and tie the tops fast to the tree by means of a cord. But it is often the case that the snow is so deep that rabbits can walk among the branches of the trees. If such be the case they must be trapped, poisoned or otherwise destroyed. Rabbits are easily caught in figure 4 traps. Bait the trap with a sweet apple. Then catch him. Now proceed to eat him. But the easiest way to destroy them is by the use of poisoned fragments of sweet apple placed on sticks a few inches above the snow. This is very effective. The animal in question is usually found beside the apple or outside it.

Borers sometimes do considerable damage in the vicinity of poplar and hickory timber. They are hatched from the larvæ deposited by a beetle during the summer. The beetle splits the bark from three quarters inch to an inch and a half in length, and deposits the eggs under the edge of the split bark. The scratch will resemble that made by a cat. An experienced eye will detect the scratch at once. They are generally to be found on the upper part of the trunk or lower half of the large limbs. There will generally be from four to eight eggs under the bark. Take the back of a pruning-knife and draw down over the scratch, pressing hard on it. You can hear the eggs crack distinctly. If unmolested the eggs will hatch in about ten days from the time when they were deposited. The little fellow begins to eat at once, and its presence may be detected by pellets of dark colored sawdust exuding through the bark. An examination will discover one or more little worms at work under the bark. Either cut them out at once, or drown them by holding a large rag over the spot, and pouring on it warm soapsuds for ten minutes. If the borers have been at work for some time, there will be some dead bark. Remove this, and then take a wire and probe the holes you find there. Generally the wire will reach and kill the worms. After killing the borers be sure and wax the wounds over.

CODLING MOTH.

To the orchardist expecting to realize money from his orchard, to know how to overcome this prevalent and destructive pest is of the

utmost importance. So great are its ravages in Illinois that the loss from its depredations is estimated at nearly five millions of dollars annually. The means of overcoming it are simple. Take a 50-gallon barrel; into it put 32 gallons of water; add one-third pound London purple, or one-fourth pound Paris green. These poisons should be thoroughly dissolved in water before adding. With a force pump and hoze and nozzle made for the purpose, spray the trees affected, using about one pail of the poisoning mixture to a tree. This should be done directly after the falling of the blossoms, and then again in two weeks, or before the little apples hang down.

When the trees grow old, pigs are a good thing to keep among them. For aphid or green lice on the new growth, boil up tobacco stems, and while the liquid is warm dip the affected limbs in and keep immersed for a few seconds, and repeat in two or three days. Very strong warm soap-suds will answer.

Trap and poison pocket gophers.

OLD ORCHARDS.

Now I will address a few lines to the orchardist who already has an orchard or a part of one.

If you have some old, sickly trees of Duchess or Wealthy, cut all the sickly limbs from the Duchess about two feet from the trunk or main branches, cover the wounds with wax, wash the bodies well with hot soap suds or with a whitewash made as follows: put into a barrel one peck of lime and two pounds of sulphur; pour onto the mixture four pails of warm water; stir till well mixed. Wash the trunk and large limbs of the tree with this while hot, using an old broom for the purpose. Manure them well to a distance of from four to ten feet from the trees. Cut your old Wealthy off at the ground and let new branches spring up. In four years you will have good bearing trees. Save the seeds from the largest and latest Duchess apples. Plant them and care for the young trees that grow from them.

Grafting wax may be made as follows: Melt one pound of white resin very slowly; take from the stove and stir in one tablespoonful of turpentine. Then with constant stirring pour in alcohol slowly until the mass is about as thick as syrup — about five ounces of alcohol to one pound of resin. Another wax is: tallow, 1 ounce; beeswax, 1 ounce; resin, 2 ounces; melted together. Always wax a wound as soon as it becomes dry. In using this wax in cool weather, keep in a bucket of warm water.

And now, my friends, what more can I say? If my article is long, I don't see how I can leave anything out without injury to my subject. That part relating to varieties does not refer to most favorable and favorable localities. I will add that if you are seeking a location for growing apples with the greatest success, go into Eastern Winona or Houston county, and in the selection of your varieties for planting be governed by the advice of the Hon. J. S. Harris, of La Crescent.

Learn how to graft from an expert or from any of the good farmers' papers, which you will take if you expect to be a good fruit grower.

Mr. Latham, from the Committee on Prize Essay on Strawberries and Raspberries, reported that papers were presented as follows: By Miss Lulu E. Danforth, Northfield; Miss E. Bessie Vandervort, Manakato; A. N. Wilcox, Hastings; John Lyons, Minneapolis; S. A. McHenry, St. Charles; R. A. Pierce, Minneapolis.

They award the prize to Master A. N. Wilcox, age 18.

STRAWBERRY AND RASPBERRY GROWING IN MINNESOTA.

By Archie N. Wilcox, Hastings.

STRAWBERRIES.—HISTORY.

The strawberry derives its name from the Anglo-Saxon "strahen," or "straw"—to scatter, as applied to the berry from the straying or scattering habits of its runners.

Its geographical range extends over both continents, from the frigid zones to the equator. The first allusion I have found to its garden culture is about A. D. 1480.

In the play of Richard III., Gloucester says: "My lord of Ely, when I was last in Holborn I saw good strawberries in your garden then; I do beseech you, send for some of them."

A hundred years later there was a garden in Holborn, then the most aristocratic part of London, among whose products four kinds of strawberries are mentioned.

Lord Bacon says: "As we have housed the exotics of hot countries, lemons, oranges, and myrtles to preserve them, so we may house our natives to forward them; and thus have violets, strawberries and peas all winter."

This idea of hot-house culture seems to have been adopted to some extent, for Switzer, writing in 1724, informs us that strawberries and cherries have been forced by bottom heat from time immemorial by the London market gardeners.

Early in the seventeenth century the strawberries from Virginia were introduced into both France and England, but do not appear to have thriven to any great extent, for in "Langley's Pomona," published in 1729, only three kinds are mentioned.

Others were introduced about this time from Chili and Surinam, one of which, the "*fragria grandiflora*," has been reckoned by botanists as a distinct species.

Their wholesome and medicinal qualities have always been highly approved, and no less authority in the botanical world than the great Linnæus recommends them for the cure of gout, and attributes his cure from that disease to the free use of strawberries.

Old Dr. Parr, when on his death bed at the age of 120 years, it is said, exclaimed: "If I can only live till strawberries come," and seemed to think that their presence was the one thing needful to effect his cure.

While highly approved, but little progress was made in its culture until within the last half century, during which time it has been developed from the small, sour fruit of our fathers into the sweet and delicious "ideal of the epicures" and often made to attain the weight of a quarter of a pound and more.

SOIL.

With its wide range of habitat and extended list of varieties, the strawberry will succeed on any good, rich or well-fertilized soil, and if the right kinds are chosen, seems equally at home on light sand or strong, tenacious clay. If we wish to plant on clayey land, we must look carefully after the drainage; for we must avoid excess of water as well as drouth. Yet the strawberry will thrive, especially on sandy land, with an amount of moisture that would prove disastrous to many other cultivated crops.

Rev. E. P. Roe says: "Though we give our strawberry plants everything else they need, our crop of fruit will still be good or bad in proportion as we are able to maintain abundant moisture during the blossoming and fruiting season." If this can be attained by irrigation or in any other way, then we may look for the best results from a given outlay on a light, sandy, easily cultivated soil. We must not allow the long hot days of June to check the growth of plant and fruit

at a period most critical in the proper development and perfection of the crop.

With this precaution and with such varieties as are best adapted to such locations, with the Crescent, alternating with the Chas. Downing or Countess as a fertilizer, the ordinary market grower will be most likely to succeed; or, if a single variety be preferred, perhaps there is nothing that has yet been thoroughly proved that is more likely to give satisfaction than the old Wilson. One of the greatest recommendations of this light soil, and why I like it best, is its easy cultivation; for we can certainly tend two acres during the season as easy as we can one on a strong, wet clay.

Soils are like individuals; every one possesses a distinctive character of its own unlike every other, and I am willing to admit that the largest and best crops of strawberries I ever saw grown without irrigation were grown on a moist, heavy soil underlaid with clay. To succeed with this, however, we must use an entirely different system of cultivation, and instead of matted rows use hills and grow strong, vigorous varieties like the Jewell and Sharpless, or Manchester and Mount Vernon, that will form a large number of strong fruit crowns from a single root.

VARIETIES.

When the Wilson strawberry was introduced to the public some 30 years ago, in its primitive vigor, it so far surpassed all other competitors in the good qualities necessary for an ideal market berry, that it fairly revolutionized the business of commercial strawberry growing; but with old age its vigor declined, and it must now yield to its younger rivals the leadership it has so long maintained. Of the varieties suitable for the climate and soil of Minnesota, which it is safe for the large growers to plant with reasonable assurance of success, (always remembering to plant the perfect flowering variety, as often as one row in four among the pistillates,) I would recommend the Crescent, a large, conical, scarlet berry, of good quality, hardy, vigorous, and healthy, and very productive, (season middle of June,) but with the fault of berry rather soft, and a pistillate or obtuse staminate blossom. Manchester, a large, round, conical, crimson, firm and good late berry, (season the last of June,) with pistillate blossom and liable to rust. Mount Vernon, a large, round, conical, scarlet, bisexual late berry, of good quality, steadily growing in favor where best known. Season last of June. Countess or Downer's, medium, round, conical, scarlet, very good bisexual, of firm texture, hardy and vigorous.

Season middle of June. Sharpless, a very large, oblong, conical bright red, excellent berry, liable to grow coxcombed; plant bisexual; strong and vigorous; needs hill culture and protection against spring frosts.

Of the new varieties many are very promising, and seem destined to surpass everything that has gone before. But when we remember the great cry that has accompanied the advent of so many that have proved disastrous failures, we should hesitate to commend any of them, except to amateurs for use in an experimental way. To such I would say, try the following list, some of which I shall test for my own satisfaction: Jessie, Jewell, Alpha, Arnold's Pride, Cornelia, and Parry. Alpha for early and Cornelia for late will extend the ripening season for six weeks or more.

CULTIVATION.

To grow a crop of strawberries alike pleasant and profitable to the grower will require the most careful attention and thorough culture at his command.

For most varieties the matted row system with judicious thinning is best, while some like Sharpless, Jewell, etc., will not succeed except in hills.

For matted rows prepare your ground as you would for an onion bed, smooth and fine, as early in the spring as possible. Mark your line by running a red string through it every eighteen inches, drawn tight across one edge of your field, close to the ground for the first row. Prepare your plants by thoroughly cutting not more than one hundred at a time, and if your ground is full of cut worms a little Paris green in the water will make itself manifest. With a small boy to drop a plant at every mark, then follow with a trowel and set your row about three inches from the line. Remember to spread the roots as much as possible, and press the dirt very firm around them. Draw your line for the next row four feet from where it was before if early in the spring, or three and one half feet if later, and repeat the operation. In this way it is an easy matter to set an acre a day, and the plants will thrive better than in any other way.

The after culture will consist of keeping the ground clean of all weeds and grass with the cultivator and hoe, and as nearly level as practicable, continue this until about September first, when they should be properly thinned and left entirely alone for the formation of fall or fruit roots, on which will depend the abundance of next season's crop. After the ground is well frozen apply mulch for winter protection,

and rake it between the rows in the spring if there is room for it there, if not remove the most of it, and they will need no more attention until time for picking.

After picking is over it will sometimes pay to harrow the field and clean it out for another crop, but this is generally a poor policy, and the better way is to plow them under and plant the field to some other crop.

Good plants for another field may be obtained by thinning the first year's growth before the field has ever borne fruit; but never take them from a field after it is exhausted by the production of a crop. We must always select some bisexual variety that will blossom at the same time when we plant the Crescent or a pistillate flowering kind for the main crop.

PICKING AND PACKING.

The cost of picking a large field of strawberries will be about one and a half cent per box for the pickers, besides the necessary supervision. Furnish each picker with a carrier holding four or six "Hallock" quart boxes, and have them returned to the packing house as soon as full, to avoid exposure to the sun. See that they are picked clean, and, if the rows are wide and thick, place two pickers, one on each side. See that the berries are picked, not pulled, from the stem and handled carefully to avoid jamming. Pack in sixteen or twenty-four quart crates, which can be procured, with boxes of the best white wood, from Michigan for about twelve cents for the sixteen quarts and seventeen cents for the twenty-four quarts.

HILL CULTURE.

For hill culture, which is essential to some of the large kinds, we may use primary plants, which may be obtained from your plant beds about the fifteenth of July or the first of August (which should be entirely independent of your fruiting beds) by cutting away all the fruit stems as soon as they appear in spring. Set these about sixteen inches apart each way, and cultivate thoroughly not later than September 15th. Cut away all runners. Mulch after ground freezes, and leave it where it lies in the spring, except to clean a small place over the crown of each plant, and the result will often prove a pleasant and profitable surprise to the grower.

PROFIT.

With a good location, suitable soil, thorough culture and intelligent

management, the pomologist may reasonably hope for a crop of three or four hundred cases per acre, providing everything is in the most favorable condition. Anyhow, he may enjoy the pleasure of anticipating an immense crop of mammoth berries as a reward for his efforts. But if the drouth comes in June, or unseasonable rains, or worms or bugs destroy, and he secures but one hundred, he may still feel that he has done better than his brother who grows wheat at sixty cents or corn at thirty cents per bushel.

RASPBERRIES.

Blackcaps (*Rubus Occidentalis*), European Red (*Rubus Idæus*), Native Wild Red (*Rubus Strigosus*).

The first of these species includes all our native blackcaps, whether black, purple or white. They propagate themselves by rooting the tips of the branches of the current season's growth, and not from root cuttings or suckers. The two latter species perpetuate themselves from root cuttings or suckers, and are distinct varieties. There is a small class of hybrids, originated by cross fertilization between these two, which may be produced by either tip-rooting or suckering. Of these the Caroline alone is worthy of cultivation.

The common name of raspberry is derived from the stahan *rasp*, probably because of the roughness of the wood. In Italy it has been cultivated in gardens since the time of Paladine, a Roman agricultural writer of the fourth century. The name "rasps" is still used in Scotland. The best varieties of blackcaps for general cultivation in this climate, are the Tyler or Souhegan for early, and the Ohio or Mammoth Cluster for late berries. Doolittle is good when young, but loses productiveness with old age.

With a desirable location and adequate winter protection, the more tender Gregg or Hillborn, or Shaffer's Colossal, will amply reward the extra pains its cultivation requires. Of the red kinds, I would place the Turner at the head of the list, followed in the order named by the Cuthbert, Marlboro, Brandywine, Thwack, and Philadelphia. Of these, the Turner, a medium, round, bright red, early variety of excellent quality, a strong grower, hardy and productive; and the Cuthbert, a large, round, crimson, firm, late variety, good quality and productive, but less hardy than the Turner, I would alone recommend for general use.

Raspberries will thrive on almost any well-drained soil of moderate richness, but wet land is always injurious and often fatal to them.

Plant in late fall or early spring, in straight rows, seven feet apart, with bushes three feet apart in the rows. If planted late in the spring, the tender shoots are liable to retard future growth. For the first season give clean culture, and, if desirable, other crops may be grown among them without injury.

Mr. Harris, from the committee on prize essays on blackberries and dewberries, and currants and gooseberries, presented the following report:

The committee to whom was referred the essays, written by persons under 25 years of age, upon the subjects "Blackberries and Dewberries in Minnesota," and "Currants and Gooseberries," would respectfully report that they have carefully examined the essays on the above subjects, and made the award according to their unbiased judgment. We find three competitors for Blackberries and Dewberries, and have awarded the Society's prize of \$25 to Master Burton T. Wilcox, age 16 years. The paper is well written, and is practical as well as clear in its description of methods of propagation, planting, cultivating; protection, training, picking and marketing. We congratulate the author upon the good fortune of being "born (not made) a horticulturist," and trust that he will meet with such pleasure and success in the pursuit of horticulture that all thorns shall bear roses, and briars bow their fruit-laden heads to him.

We also recommend that the essay of Miss Edith A. Kellogg, of Janesville, Wisconsin, which is also an able and valuable paper, be published in our volume of Transactions, and that the Society do extend to her a vote of thanks, and elect her an honorary member of this Society for the term of five years.

We find only one paper on Currants and Gooseberries, written by S. A. McHenry, age 23, and report that he is entitled to the prize offered by the Society of \$25.

J. S. HARRIS, A. W. SIAS, WILLIAM LYONS,	}	Committee.
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GROWING BLACKBERRIES AND DEWBERRIES IN
MINNESOTA.

By *Burton T. Wilcox, Hastings.*

SPECIES.

High Blackberry (*Rubus Villosus*). Dewberry, (*Rubus Canadensis*).

Both these species grow abundantly in the wild state all over the United States south of latitude 45 degrees, and are the parents of all our cultivated varieties. Stems three to ten feet long, pale green to dark brown color, and covered with strong, sharp prickles; does best on rocky or sandy soil in a wooded region; flower racemed, long, with short bracts; fruit oblong or cylindrical; high blackberries, strong and erect canes; dewberries long, low and trailing in habit.

Some hybrids have been successfully produced by cross-fertilization between these two species, whose descendants have proved our best market berries. But the difficulty encountered here by the fruit-growers of Minnesota is in the want of hardiness, characteristic of both parents. Still we may hope, when our worthy pioneers in pomology have devoted one-half the energy and effort to produce hardy varieties of blackberries which they have given to the equally tender apple, to see them successfully grown in every county of the State.

The blackberry and dewberry are so near alike in the requisites for their successful cultivation, that I shall consider them together in a general way in the notes which follow.

With its wide geographical range the blackberry seems to thrive upon almost any kind of soil, and will resist drouth better than any other of our small fruits, and my preference for a moderately light sandy soil would only be because in such a location it could be much easier cultivated, especially when laying down for winter and would be more likely to fully ripen the young wood before the frosts of winter came upon it; still the Snyder will often lose its foliage on sand. When you are choosing a location bear in mind the fact that a field of blackberries well established will continue to improve for many years, and select just what you wish to use permanently for that purpose.

Plow deep, even subsoiling will pay, and work fine as you would for a premium crop of corn. Then mark in straight rows seven feet apart, and set three feet apart in the row, be sure to spread the roots when setting and press the dirt very firm about them. Set full as low as the plants formerly stood, and you will have little difficulty

about their growing. Early in the spring is the best time for setting, before young shoots start. If you wish to, plant potatoes or beans among them; it won't hurt them as bad as a crop of weeds.

When the canes have reached a height of two feet the first season, or three and one half feet afterwards check the growth of the main stems by pinching back, or if they get the start of you, cut them back to the desired height. This will cause the formation of lateral branches and give much better results than it will to allow a tall and unchecked growth.

The best way I have ever seen to do this is to walk on each side of the row with a long sharp butcher knife, strike quickly right and left at every sprout that shows its head above or outside your ideal row. This is a much faster as well as better way than the old style of pinching back with the thumb and finger; and it enables you to keep them as even and handsome as a well turned hedge row.

As soon as picking is over remove all the old wood by cutting close to the ground, and at the same time thin if necessary to what you desire for your next season's crop, four or five good strong canes in a hill or one in six inches if grown in a row is better than twice as many. After the old wood is removed one good thorough cultivation of the ground is all that is necessary, as we wish to check the growth in time to harden the wood rather than induce a late and tender fall growth.

If this part has been well done, the ground made smooth and mellow, and the canes properly thinned, it will greatly facilitate the next operation, which is the most important of all to the successful culture of blackberries and dewberries in Minnesota.

While the strawberry and raspberry are generally hardy, and will sometimes return good for evil, rewarding their owners for their neglect, the blackberry is far more tender, and naturally grows as an undergrowth among the trees somewhat protected from the influence of our prairie zephyrs. So while some hardy varieties with small berries, and more like the type of their wild ancestors will stand our climate fairly in favorable locations, we must not expect our better varieties to do so, and our only safety lies in regarding them as tender, and giving them all the winter protection possible. I would rather risk the tenderest blackberry with a good covering of dirt than the hardiest without it.

Pinch back between two and three feet high to increase the growth of lateral branches, and stop cultivation in season to harden the wood before freezing weather. In spring prune laterals to one foot in

length, and if injured cut back to sound wood. And here I might say take no risk of losing a crop by winter-killing when they can be so easily saved by covering over, the same as the blackberry. We may rest assured they will pay by extra yields for all the extra labor, even if it is not necessary to save the crop. As soon as convenient after the bearing season is over, cut out all the old wood and the new shoots to four or five inches in each hill, always bearing in mind that all raspberries are perennial, and that we must lay the foundation for the next season's crop by securing a vigorous growth of healthy shoots at this time. Besides, a careful pruning now will greatly assist in the after-culture and winter protection.

We cover by removing several inches of earth from one side of the hill, so that the plants may be bent over by bending the roots, and then cover the whole plant with earth. This must not be done until or near freezing weather as possible, and should be removed early in the spring. After lifting them in the spring, cultivate shallow but thoroughly. The best mulch to guard against drouth is three or four inches of fine, loose, easily stirred soil. When the time for picking arrives, gather as often as once in two days, and pack directly in the boxes in the field when picked. For blackcaps, use quart boxes and 16 quart cases, and for red, pint boxes, and 24 pint cases, and market as soon as practicable after picking, as they are never better than when first taken from the bushes. Crates will cost, with boxes, 12 or 14 cents each. There is probably no branch of horticulture that pays better for a series of years than a good field of raspberries, as they are a comparatively sure crop, besides always bringing a fair market price, as their soft natural condition and rapid deterioration prevents our southern neighbors from filling our markets with hundreds of carloads in a season, as they often do with the firmer strawberries and grapes.

In conclusion I would say, while I have worked with great pleasure in our berry fields, and enjoy both their cultivation and the opportunities for study they afford, yet this is my first, and I fear my last, attempt to describe our various operations. Besides on every page I find, on reading it over, that I have omitted many things which time and limited space will not permit me to rewrite and describe. Therefore I will close by wishing prosperity and extended usefulness to all the members of the Minnesota Horticultural Society, hoping when my school days are over to be worthy to sit at their feet and learn wisdom from their councils.

We cover the canes late in the fall as possible before freezing weather, and it may be done by one man, or what is better, by two

working together. It is always desirable to lean all the bushes in a row in one direction, and this is done by thoroughly loosening the dirt, and moving two or three spades full from the side we want them to go; then place a fork on the opposite side, and as you press them over place your foot on the canes next the ground so as to press them all together, and avoid breaking by binding them in the roots and below the surface of the ground; fasten the tops down with a shovel-full of dirt, then press down the laterals and cover thoroughly from root to top with two or three inches of dirt.

Some varieties, like the Wilsons and Dewberries, of low, slender habit, cover much easier than those of larger and more woody growth. Some leave the latter after fastening the tops, which may do in favorable seasons, but large fields of Lawtons left in this way last winter in Michigan were killed when they stuck out of the ground by a hard freeze when there was no snow over them.

In the spring, gently lift the top of the bush from the ground with a fork, and after shaking off the dirt, leave it in its leaning position for a week or ten days, during which time it will gradually assume a more erect attitude; then go through the field with shovel and shears, placing the bushes erect in line with a little fresh dirt at their bases, and pruning away all injured or superfluous wood, and you will have a field that will gratify the eye of an artist and the taste of an epicure, as well as the avarice of the owner.

Keep your field clean and cultivate fine until the first blossoms appear, and they will be better to be let alone until after picking is over, unless it is necessary to stir the surface lightly to counteract the effects of drouth, in case of which constant cultivation will often save the crop. The best mulch known is to have four inches of finely pulverized soil all over the top of the ground.

Blackberries should be picked two or three times a week after they begin to ripen. This is best done by a picker on each side of a row, armed with a carrier and six quart boxes each, and will usually cost about one and a half cents a quart, or one half the cost of strawberries and raspberries.

Pack in sixteen or twenty-four quart cases and they are ready for market and will ship five hundred miles or more in perfect condition.

Twenty-five years ago there was but one prominent variety, the Lawton, in cultivation; this long remained, like the Wilson strawberry, far in advance of all competitors, but with the present stimulated interest in pomology several newer varieties promise to supplant it in popular favor. Among these — the most hardy and best adapted

to the soil and climate of Minnesota, besides possessing many of the good qualities desirable in a market berry — I would recommend Snyder, Taylor and Ancient Briton, for a succession from early to late, as likely to succeed as any I could name. Stone's Hardy is small, but well liked in some places. Western Triumph is hardy, and that is all the good I know of it. But if God should decree that I should pass my life in Minnesota, I shall endeavor to grow the Wilson's Early, Wilson's Junior and the Lucretia dewberry, as the largest, earliest and best of all the blackberry kind. Still they are all tender, and knowing they are tender we propose to take care of them. Who would think of succeeding in dairying if they left a herd of fine Jersey cows to "rustle" for themselves through the winter around a straw stack.

The best plants for setting may be obtained from root cuttings by dividing the roots into sections of two or three inches in length and planting in soil the spring before we want to use them. These make roots freely if the soil is moist and pressed firmly around them, and are far preferable to plants obtained from suckers in an old bearing field. If you are obliged to buy them, they will cost from \$3 to \$10 per 1,000, standard varieties.

The profit of blackberry culture depends entirely on our success in protecting them through the winter; for they have no insect enemies and but small liability to disease to cut short the crop. Yet I well remember how a fine field of the "ironclad" Taylor, which my brother and I rented last year in Michigan, failed to give us a single case; and our Western Triumph were no better, while our "*tender*" Lautons and Wilsons, that were laid down on both sides of them, were very fine.

I have known the Snyder, which is best adapted of all kinds to a heavy, strong soil, to produce as high as six hundred cases of sixteen quarts each per acre, but one-half of this is a large yield under the most favorable conditions, while fifty cases was more than the average last year in Michigan.

In exposed locations on our prairies, where the wind would be liable to break over the bushes and injure the fruit, we may protect them by sticking posts about thirty feet apart in the row, and drawing a wire on each side, tight, about two feet above the ground. One of the wires can be easily removed when we want to lay them down; or the dewberries may be trained to these wires. But these precautions may be unnecessary if we trim back more, and make a low thick bush, instead of a taller and more slender one.

Blackberries must not be neglected at any period of their cultivation, and the beginner will derive more satisfaction from a small field well cared for than from a much larger one if it is allowed to get the start of him; for of all slovenly and unprofitable fields a lot of unkempt and neglected blackberry briars will take the prize.

BLACKBERRIES AND DEWBERRIES IN MINNESOTA.

By Miss Edith A. Kellogg, Janesville, Wis.

What varieties of blackberries are best adapted to culture in Minnesota? Have we any variety hardy enough to bear well in Minnesota without winter protection? No. The best varieties for culture are Ancient Briton, Snyder and Stone's Hardy. I should plant Snyder for early, Stone's Hardy for medium, and Ancient Briton for late. I would prepare the ground by plowing deep, manuring heavily, forty to sixty loads per acre, and thorough cultivation. Have the rows eight feet apart, and the plants three feet. Keep them in hills, and do not allow them to spread over the ground. Keep all the suckers down if you want choice fruit (this is easily done with a horse and cultivator), and pull out where they grow too thick. Do not allow over five canes in a hill. All blackberries should be protected in this latitude. A spadeful of earth may be removed on one side of the plant, binding the plants down till the tops touch the ground; then fastening down with a little earth, and covering with dirt, marsh hay or corn fodder; or even coarse manure will answer the same purpose where there are no mice. Remove the covering in the spring as soon as freezing weather is done. Raise them up with the fork, and press the dirt firmly with the foot on the side where it was removed in the fall, and tie to a wire stretched on posts, two and a half feet over the row. Work the coarse manure well in under and about the bushes; this serves the double purpose of choking weeds and grass, and keeping the ground moist during the scorching days that, as a rule, are to be expected in August. Pinch the new canes back to about three feet and three and a half feet in June and July. This causes them to branch out. Do not prune the laterals, for if you do, you will cut off the part where our best fruit grows. Take off nothing but the top of the upright cane. The cost of covering is from six to ten dollars per acre. Some think that it is better to place a trellis on each side of the row, and the wires about two and a half feet from the ground, and stakes twenty feet apart. One wire on each side is sufficient. Dew-

berries require the same culture and care as blackberries. The best varieties are Lucretia and Bartell's Mammoth. Cover with marsh hay, and in spring tie them to a single wire eighteen inches above ground.

CURRENTS AND GOOSEBERRIES IN MINNESOTA.

By S. A. McHenry, St. Charles.

Currents and goosberries though not the most valuable of fruits have their places to fill as well as the strawberry and the more delicate fruits.

They are natives of this country, and are generally found on damp, heavy soil when growing wild. As they by nature have chosen a damp heavy soil it would be well to give them a similar soil when planted for cultivation. When such a soil is not to be had, much may be done to insure success by deep plowing, subsoiling, and by an abundance of mulch around the plants throughout the summer. Currents and gooseberries require a great amount of nutriment, and should receive an annual dressing of some heavy compost in which muck, leaf-mould, wood ashes and cleanings from a cow stable are largely present. The best time for transplanting the bushes is in the fall any time after the wood is ripe, but if set very early in the spring nearly the same results may be obtained. They should be planted in rows four feet by six. By planting this distance they may be cultivated both ways.

A hoed crop may be planted between the rows the first two years. The plants should be set about two inches deeper than they stood in the nursery row. If two year old plants are set, fruit in paying quantities may be expected two years from time of setting.

After the first three years they will require less cultivation and more mulching. They may be trained in either the bush or the tree form, but if fruit alone is the object the former method is best and is most natural for the bushes and requires less labor. If for ornamental or other purposes the tree form is desired it would be well to train them so from the cutting, by removing all but the top bud from the cutting at the time of setting. Young wood produces the best fruit. The old wood should be cut out as soon as it begins to show signs of weakness and bears fruit of inferior size.

One great advantage of currents and gooseberries over most small fruits is that they may be left on the bushes for some time after they are ripe, but when so left they do not ship as well as when promptly

attended to. They are sometimes picked in quart boxes but are generally handled in baskets of larger size. Currants should be picked in bunches and shipped on the stem. If torn from the stem the skin is broken and they soon decay.

PROPAGATION.

Currant and gooseberry bushes are easily propagated by cuttings and layers. Cuttings are best cut in the fall during the month of September. They are made of the last year's wood and should be about eight inches long, and should be planted at once in a rich moist soil, and the ground pressed firm about them.

Only one bud should be left above ground. Before the ground freezes in the fall the cuttings should be well mulched with stable manure.

Cuttings may also be cut in the spring or may be cut in the fall and tied in bunches and buried or kept in moist earth in the cellar, but they do not root as well set in the spring as when set in the fall.

The following paper was read by Mr. Brand:

THE APPLE.

WHAT MAY WE REASONABLY EXPECT FROM IT IN MINNESOTA?

By O. F. Brand, Faribault.

For the purposes of this article the subjects of cultivation, pruning, location and soil are each too comprehensive to be more than incidentally alluded to.

ORIGIN.

That the common apple is as old or older than the human family there is little room to doubt. Aside from Holy Writ apples are mentioned by Theophrastus, Herodotus and Columella. The latter, who wrote in the early part of the first century, describes three methods of grafting as handed down to him by the ancients, as well as a fourth method of his own. Philip, the elder, who wrote a few years later than Columella, said: "There are apples that have ennobled the countries from which they came, and our best varieties will honor their first grafters forever; such as took their names from Matius, Cestius, Manlius and Claudius." Speaking of apples at Rome, he

wrote: "There were some trees in the villas near the city which yielded more profit than a small farm." Thus, in those ancient times the introducers of a new apple were esteemed honorable among their fellows, and their names will go down to remote posterity as benefactors of their race.

AMERICAN APPLES.

The introduction of the apple into our country dates back to 1629, when seeds brought from England were first planted. On April 3, 1632, Governor's island, in Boston harbor, was granted to Gov. Winthrop, on condition that he should plant thereon a vineyard or orchard. Many of the first trees grown from seeds in Massachusetts lived to be more than two hundred years old. From this date we find that an effort to raise apples was made by nearly all the pioneers of our country, and their efforts were nearly always crowned with success.

The oldest orchard in the West of which I have any knowledge is at St. Joseph, Mich., just across the lake from Chicago. They consist of less than a dozen trees on the banks of the St. Joe river. The seeds from which these trees grew were planted by an Indian trader named Burnett, in 1776. The best of these trees, which are now a hundred and nine years old, stand less than two hundred feet from the river, and not more than four feet above its level. They are still productive.

In Wisconsin apple seeds were among the first things planted. In 1839 G. De Neven planted apple seeds near Fond du Lac. They soon came into bearing, survived the severe winters of 1842 and 1856-57, and were bearing large crops when I last saw them, in 1869.

The success of these seedlings encouraged all to plant apple trees, and that county became famous for its large crops of fine apples. I paid a visit to that locality last fall. But very few of the trees set from twenty-five to thirty-five years are left, and they are Duchess, Talman Sweet and Seeknofurther. The best old trees are now on moist land. The Duchess is alive everywhere.

In stating what our expectations of the future of apple growing in this State are, and what they are based upon, I will say that we must be careful that we interpret correctly the lessons of the past—experience in the history of apple growing in our country and especially of the last 35 years. The lamp of experience is a safe guide if made to reflect the united wisdom of millions of people through hundreds of years.

IN WINONA COUNTY.

We will now review the history of apple growing in our State. In the fall of 1851, John Shaw, of Exter, Maine, gathered by the aid of his neighbors from ten to twelve quarts of apple seed. He arrived at Minnesota City in the spring of 1852, and after having selected a piece of land prepared a piece of ground in the timber for his apple seeds. He only lived to see the seed come up, and his dying request was that the trees should be divided among the members of the colonial association to which he belonged. This was done; enough to plant a large orchard being kept by the widow. All the farms in the neighborhood had enough for a good orchard, when the seedlings had attained sufficient size. Here is the first record I can find of the beginning of apple growing in the best fruit district in our State. It is recorded of this lot of trees that their product in one year was between five and six thousand bushels.

In the fall of 1871, traveling as a member of the committee *Ad Interum* for this Society, I visited the original orchard of the widow of Mr. Shaw and found about three hundred trees in heavy bearing, bringing in a handsome income. I think it was in that year that it bore 600 bushels. I am told that some of the trees were very productive up to 1884-5. Taking it for granted they began to bear when seven years old, we find they were in bearing twenty-five years. Is there anything discouraging about that? Now let us investigate the ancestry of the seeds from which these trees sprung. In an article by Henry Little of Maine, written in 1853, we find among one hundred and forty varieties mentioned the apples grown there were largely Sops of Wine, Maiden's Blush, Gravenstein, Hubbardstons, Nonsuch, Rhode Island Greening, William's Favorite, Ribston, Pippin and Baldwin. He says the Duchess was first brought there in 1847; it is very unlikely that its seeds were among those secured by Mr. Shaw.

If such results as those above mentioned can be produced by the use of such ill-adapted means, what may we not expect from seedlings grown from our own hardiest of all acclimatized apples, the Duchess de Oldenburg?

In the fall of 1871, as before mentioned, I visited many orchards in Winona county, which were of the best grafted varieties, set from 1856 to 1860. In numerous instances I found trees bearing twelve to fifteen bushels on a tree. Among the many I will mention those of our old friend and co-worker Hon. Norman Buck, who raised that year nearly 300 bushels; Hon. C. F. Buck, 200 bushels; G. W. Clark,

250 bushels; Orion Clark, 200 bushels; Mrs. Mary A. Campbell (formerly Mrs. Shaw), 600 bushels; M. K. Drew, 300 bushels; S. Bates, 300 bushels; W. R. Stewart, 400 bushels; L. Thomas, 600 bushels. These were mostly tender Eastern varieties. In one orchard I saw five trees from which the owner told me he had gathered one crop of 100 bushels, worth \$150.00. A good record for a climate where we "can't raise apples." These trees were alive and bearing in 1873.

IN HOUSTON COUNTY.

I visited the same fall several orchards in Houston county, and the great quantity of fruit on the trees astonished me. In the orchard of our friend Harris I was shown two trees from which one crop sold for \$44. They were St. Lawrence. His Talman Sweets were bending under an enormous load of apples. A few trees of that variety gave him 40 barrels that year and over 200 bushels the year following, that being the ninth year in bearing. Here also I saw that grand apple (but very tender tree) Jersey Sweet in bearing, and many others too tender for other portions of the State. Price's Sweet, only six years planted, bore two barrels to a tree. Is there any other portion of the United States that could do as well? He raised twenty barrels of Northern Spy in 1872. In our section the Spy has never blossomed.

Now let us reason together. If the same causes that killed this orchard for Mr. Harris also killed trees down in Central Illinois, Indiana and Ohio, why is it not reasonable to conclude that that portion of our State is as valuable for growing apples as the the other states mentioned?

In 1867 I traveled on foot all over Houston county once and a large part of it twice, and have been there a good many times since up to 1876, and I state now what was my opinion when I was among the orchards there in 1876: that if all the good orchard sites on a strip ten miles wide from the mouth of the Zumbro river to the Iowa line, in the eastern part of Winona and Houston counties, were devoted to apple growing in a businesslike way, the people of our State would have no need to send outside of our borders for apples.

The orchard of Mr. Harris was indeed a wonder for a State like ours, where but a few short years ago Mr. Lo held undisputed sway. Let us figure the sum realized from his Talman Sweet and St. Lawrence. They began to bear well about 1864 and bore their last crop in 1884. The two trees of St. Lawrence paid him about \$200 net, besides the fruit used from them in his family; they were in bearing each alter

nate year for sixteen years. We can plant ninety trees to the acre, the trees standing about twenty-four feet apart each way. At that rate the crop of each acre would be worth \$1,125. Talman Sweet also began to bear in 1864 and bore full crops each alternate year up to 1884, some of the trees being still alive. Mr. Harris thinks 1,000 bushels a low estimate of the total yield. These sold for about \$1,200, or \$120 a year for each bearing year, or an average of \$6 per tree. At that rate an acre would produce \$540 each bearing year, or \$270 per acre for the whole time.

THE "ORANGE BELT."

In these times of pension vetoes, chintz bugs, sixty cents a bushel for wheat, no more free passes on railroads, and the tariff likely to be taken from wool, are not St. Lawrence, that pay over \$500 a year, and Talman Sweets, that pay \$270 per acre a year, as good as anything we can go into, provided we live in Houston or Winona county—the orange belt of our State?

Another small tract at Reeds Landing and along Lake Pepin is also favorable for fruit growing. Here there is always or nearly so open water. Pear trees bore three bushels on a tree at Reeds Landing in 1867, and the crop from two trees sold for \$100.

Let us now leave the "orange belt" and go back north and west where the fierce winds coming from the treeless, arid plains of the bleak Northwest, destitute of moisture, blow scorching and withering in summer,—pitiless and enervating to all vegetable or arboreal life in autumn, winter and spring. Here we find apples also, but less varieties; the hardiest list from the orange belt lived in many places up to 1873, but the quantity of fruit produced, except in a few instances, was not sufficient to give much encouragement to the planter. Many varieties which seemed hardy in tree up to 1873 did not seem to form hardy fruit buds. The one notable exception being the Duchess of Oldenburg. A few other varieties were more or less fruitful in very favorable seasons. This great district has localities in it more favorable than others. Such as can be found along the Mississippi river, extending back in places thirty or forty miles; and also along the southern tier of counties west from Albert Lea to the State line. In this district not only do the Wealthy and Duchess look better than in a large part of the State, but there are some old Golden Russets to be found and a good many seedlings planted as long ago as 1863, are still in fair condition. This region extending to Blue Earth county on

the northeast and up to the high land north of Lu Verne, is of somewhat different formation and climate. It is in fact influenced more by the Missouri than the Mississippi valley. The Ben Davis stood very well in 1884-5 at Sioux Falls, right at the west end of this district.

I am led to this view of the matter also by the further fact of so many old seedlings standing so well all through this region, while in the counties northeast, such as Rice, Le Sueur, Scott and others, the seedlings were nearly all killed in 1872, and the remainder, with but one exception, completely annihilated in 1884-85; the one exception being the orchard in which the Peerless stands. That southwest portion of the State, together with the river portions above mentioned, not included in the first district, we can call district No. 2, and reasonably expect it to produce apples that cannot be grown in the larger portion of the State.

Over the rest of the State south of the forty-fifth parallel, and in some localities above that, the Duchess, or anything equally hardy, can be grown with great success by any one who will inform himself how to plant and care for trees, and then give them the same business-like care and attention that insures success in any honorable pursuit in life.

IN RICE COUNTY.

In the fall of 1855 Franklin Kelly brought with him a lot of apple seeds from New Hampshire and planted them on new land that fall. They began to bear in 1863 and bore well ten years, bearing a single season 150 bushels. The total crop in the ten years was 800 bushels; it was on a southern slope on the prairie near the city of Northfield. No grafted varieties except the Duchess have done as well under similar conditions, and it killed out in 1872-3. The seeds came from a section where they raised nearly the same list they did in Maine; such as Early Harvest, Grauenstein, Astrachan, William's Favorite, Spitzenberg, Baldwin, etc. From such ancestry we could hardly have expected more.

In our locality are to be found good Duchess trees that have stood twenty-five years and are still very productive. We have seven trees of Duchess set in spring of 1867. I believe they are good for twenty years more. They stood so close together they could not bear well. I cut out a number of them last spring. We never lose any Duchess, although we have lost nearly all the Wealthy and hundreds of trees of

other varieties. We now have about four hundred Duchess in orchard, and last spring set about five hundred more. Duchess will become still hardier if we propagate from our best and healthiest bearing trees, and it may be deteriorate by being propagated from feeble young trees. It needs a plentiful supply of moisture in the soil. The most of those that have died in Minnesota have become enfeebled either from lack of moisture to enable them to make a perfect and healthy growth, sunscalding of the body when exposed to the winter sun before the bark had become rough, or from being left in the fall with a clean, cultivated surface around the roots. Duchess needs a low, large, spreading top on the south and southwest sides. With such a top, soil reasonably moist and the roots protected with a thin mulch in the fall, it will not be injured. As long ago as 1872 our friend Harris put himself on record saying apple trees will grow any place where water stands within two feet of the surface.

The unusually wet fall of 1886 taught me a valuable lesson on soils and conditions of soils for apple trees. The latter part of September and first half of October was extremely wet. I then had one hundred and twelve seven-year-old Duchess on some very moist timber land. I said to myself those trees will show a yellow, sickly leaf next summer and undoubtedly will die from a wet root. The summer found them with a fair crop of fruit and a vigorous, healthy leaf and growth, and notwithstanding the ground was so wet in April and May, 1886, that we could not get onto a part of it till very late, they bore a fine crop of fruit, and are now models of health and vigor. They stand on a western slope with ground descending gradually to the south and west for a mile.

The past two summers I have seen *thousands* of good, healthy bearing Duchess trees scattered through all of the following counties: Rice, Steele, Faribault, Waseca, Le Sueur, Redwood, Lincoln, Lyon, Sibley, McLeod, Scott, Dakota, Carver, Ramsey and Goodhue. I am firmly of the opinion that before the close of this century we may reasonably expect to supply our own market for apples of its character with our own productions. In the summer of 1886 Duchess apples were so plentiful in our market that they sold as low as fifty cents a bushel for a few days, and some were sent to other points. The trees are now being planted largely.

FALL AND WINTER APPLES.

As we have now been informed where our summer apples are to come from, where shall we look for our fall and winter apples. I an-

swer, we must look to the seedlings of the Duchess of Oldenburg. Why? Because its trial of thirty years in the unfavorable localities of this State prove it to be more nearly perfect in its adaptation to the requirements of our rigorous climate than any and all other varieties.

Among the very first large orchards planted in the State was that of the late George Dorrance, of Rice county. This orchard consisted of several hundred trees set about 1857, as I am informed by the oldest settlers. The varieties seemed to include almost the whole list of popular Eastern sorts—among them the Pippins, Seeknofurther, Wine Sap, Fameuse, Swaar, Talman Sweet, Golden Russet, and, fortunately for us and the future citizens of the Northwest, there were of those that lived to bear six Duchess. The site of this orchard is in the town of Walcot, Rice county, in the extreme eastern edge of the Big Woods. It consists of a bench and hillside on the east, the top of the bench being about forty or fifty feet higher than the meadow or slough land east of it. In an early day there was timber about sixty rods west of the orchard. The soil is a marl or clay—a soil on which the Duchess does not live as long as on a rich alluvial soil on clay subsoil. In 1867 sixty-four trees bore thirty bushels of fruit. In 1867 the Duchess bore very heavy crops, and a large number of the other varieties were in bearing that year. From this crop of Duchess apples G. J. Miller, a neighbor and relative of Mr. Dorrance, living on the prairie two and half miles distant, sowed and planted a large lot of seeds and raised more than two hundred trees. I saw the trees in 1875, several of them bearing well; six of them are still alive and bid fair to live for years. Many of those that died in 1884-5 bore a great many large crops of fruit, and proved to be profitable. Of those still alive, one of them named "Itasca" has always, from 1875 to 1886 inclusive, borne enormous crops of apples. In size and color about like Rawles Jannet. In flavor rather poor, but somewhat better than the hardiest of the new Russians. Its season is October and November. In productiveness the Itasca is the equal of any tree of its size I have seen in the State.

Another tree is almost a reproduction of the Duchess, and about ten days later. Two others are worthy of mention, but I omit them. The best of the lot is the Peerless, which by a vote of this Society last winter was pronounced the best seedling apple known. I bring the Peerless up, and offer its achievements in evidence, to prove my claim that as the parent of a class of apple trees perfect in their adaptation to the wants and requirements of our climate the Duchess has no equal.

It must be remembered that these seedlings are in an unfavorable

locality. They are out on the broad prairie, remote from water, and one hundred miles northwest of the best fruit-growing part of the State; the soil a black prairie loam. Here the Wealthy trees were all killed in 1884-5, and out of thirty Duchess trees planted the same spring with the apple seed (1868), and a good many planted since, only four or five trees now remain. Now, all of these seedlings being later in season than Duchess, the Peerless keeping in good condition till February, is it not reasonable to conclude that by a proper system of selection trees may be produced that will bear apples of long-keeping qualities?

I have now planted in orchard about seventy-five trees of selected Duchess seedlings. I undertook to begin this business in 1873, after the previous winter had swept away nearly everything in my locality except the Duchess. That summer I had seen in the orchard of our friend Norman Buck, at Winona, two good bearing trees standing apart from the rest of the orchard; one was the Rawles Jannet, and the other was Duchess. It occurred to me that here would be a good chance to get a cross combining the ironclad constitution of one parent with the flavor and keeping qualities of the other; but the Duchess blooms earlier than the other, so, to obviate that difficulty, I made arrangements with Mr. Buck to mulch the Duchess well on the snow, so as to retard its blooming to correspond with the Jannet. I was then to have the crop of Duchess apple seeds, for which I was to pay him \$10. He did the mulching, but the hens went up, either while he slept or at some other time, and scratched it away, and our experiment failed.

NEW RUSSIANS.

My attention was then diverted to New Russian apples, and for awhile expected great things by a shorter cut than seedling apples, not knowing that we were simply repeating an experiment that had been tried in Europe before I was born, repeated in this country in the first half of the present century, and that as the result of those trials the Duchess had been handed down to us as the best of all.

Outside of professional nurserymen it is hard to find a single tree of New Russian apples, although hundreds of thousands of them have been sold and planted since 1873 up to 1884. So general was their destruction that out of three hundred and thirty varieties sold our friend Pearce offered to give \$5 each for every tree that could be found alive in 1886. In my section some of them live, but don't bear fruit. I have a tree fourteen years old on which I have never seen but one

poor little apple. I have a sample of the wood. You will see this wood looks all right. I have several varieties but little better so far as productiveness is concerned. My observations have not been confined to my own grounds or locality. I have traveled extensively, and with my eyes open. Surely, our experience has been great enough and costly enough to decide us against a further trial of New Russians.

Of the origin of the Duchess we are not told. In 1882, when Prof. Budd was at Kazan, on the Volga, he wrote that he had doubts about its being a full-blood Russian, although he saw a large list of its type. It seems to me that he was at those northeast points too late in the season. It may be that if he did see the trees, he did not recognize them under their changed condition. Kazan is about five hundred miles east of Moscow, and half way between the Caspian sea and the Arctic ocean; eleven degrees north of St. Paul, and nearly at the extreme northern limit of apple-growing in that direction. But, irrespective of its origin, it has proved to be the most valuable tree known on this or any other continent for us to raise a race of acclimatized seedling trees from. In 1882 that old Western pomologist, F. R. Phoenix, wrote for this Society an essay of about 6,000 words on "Hardy Apples From Seed." The article was ably written throughout, but the gist of it, as applied to us, was: "Raise your apple trees from seeds of Duchess." His views were warmly indorsed by Harris, Dartt and Gibbs.

About twenty years ago Col. D. A. Robertson, at that day the most eminent authority in the State, advised me to go to raising seedlings from Duchess, and, although we have had the world, the flesh and the New Russian apples to contend with, we have made some advance.

Our friend Harris has often advised us to raise seedlings. Our president in his last annual address said: "Should we not rather seek for hardy varieties among our own native seedlings?"

That great and good man, pre-eminent in pomology, the late Marshall P. Wilder, writing upon this subject, said: "The immense loss to American cultivators from the importation of foreign varieties * * suggests the importance of raising from seed native sorts, which in most instances possess peculiar advantages. I am confirmed in the opinion that the best means of producing new and excellent varieties suited either to general cultivation or to particular localities, is to plant the most mature and perfect seeds of the most hardy, vigorous and valuable sorts, on the general pathological principle that like produces like. The skillful agriculturist saves the best seed of his various crops and selects the best animals from his herds for breeders.

Why should not this law of reproduction regulate the practice of the pomologist as well as of the farmer? * * * Our object is not to controvert the opinions of those who believe in the running out of varieties * * * but to enforce the importance of raising new varieties from seed."

Fellow members, the lessons of the late war taught us that fearful repulses like Cold Harbor and Chicamauga will precede final victory. We have *met* our Cold Harbor and Chicamauga, but athwart the darkness of defeat, to those of us who with faces toward the foes which have confronted us, the star of hope shines brightly and victory is just ahead.

"No waters can swallow the ship where lies
The Master of ocean and earth and sky."

All we need now is faith and perseverance. The prospects to my mind have never been so bright as they are now. If we read aright the lessons of the past and are guided by their teachings there will be no more failure, and the pomology of our State will be placed fully abreast of the advanced progress of the age.

Mr. Brand also placed on file the following correspondence:

LETTER FROM NORTHFIELD.

NORTHFIELD, Jan. 10, 1888.

O. F. Brand, Esq.

DEAR SIR: Your card of December 29th is received, asking for the history of my old seedling orchard. The seeds were brought from New Hampshire by my father, Franklin Kelley, in 1855 and planted that fall on land broken in the spring. The trees grew vigorously and commenced bearing in 1863, and continued to bear until we got as many as one hundred and fifty bushels in '69, and as many two or three years following.

One year I exhibited fifty varieties at the Hennepin county fair at Minneapolis and received a premium of \$10. The same fall I took the premium for cider, of which I made several barrels. I had the honor of making the first barrel of cider in Rice county, which was exhibited at the Rice county fair in 1866, I think.

My orchard continued to do well, with the loss of an occasional tree, up to the winter of— You know, when they got such a scorching that every one has since given up the ghost. I had commenced to propagate some of the best varieties, and had out about a thousand

root grafts which shared the fate of the old orchard. Although I was a member of the State Horticultural Society in those days, and attended the annual meetings with a view to "acquiring knowledge," I never found out what killed that orchard, and why I am obliged to pay my grocer twenty-five dollars every fall for a winter supply of wormy Michigan or Missouri apples.

A few of those trees were heavily mulched that fall—so much so that the ground did not freeze, others were exposed, while still others were banked with snow into the very branches a greater part of the winter.

A few varieties were superior in texture and flavor to any fruit I ever tasted from other states. Three or four varieties, although not properly winter apples, would keep till April or May.

If I have not covered the whole ground, shall be pleased to answer any questions desired.

Yours truly,

D. F. KELLEY.

NEW RUSSIANS.

FARIBAULT, MINN., Jan. 4, 1888.

Friend Somerville,

Will you kindly inform me—

1. How many trees of New Russian apples have you in profitable bearing?
2. How many bushels have you ever gathered from a single tree in one year? Name of best bearing sort?
3. How long have trees been planted?
4. How old were they when planted? Names of six best sorts in order of productiveness?
5. How many bushels have you ever gathered in a year of New Russians?
6. What is your soil and slope?
7. Are there any valleys near your orchard? How near, on which side, and how deep and wide are they?
8. Are you protected by timber? How much, and in what shape?
9. Is there water near the surface? How deep is your well?
10. Did you ever raise the Talman Sweet there, and about what year did they bear their last crop of apples?

In the interest of pomology an early reply, with the return of these sheets, will greatly oblige me.

Yours truly,

O. F. BRAND.

REPLY..

VIOLA, Jan. 9, 1888.

Friend Brand,

I will try and answer your questions as near as possible:

1. Twenty or twenty-five of the New Russians.
2. I cannot answer that question very correctly, but one tree last fall, I think, had six bushels of apples.
3. Nine years this spring, those in profitable bearing; but I have planted some each spring since. I think I have fifty or sixty varieties in my orchard.
4. Three and four years. The largest apple I raise is the Charlamoff; the best bearer is the Antonovka and Red Streaked; the prettiest apple is one I cannot name, nor could Prof. Budd. Mr. Sias calls it the Wax Transparent; a biennial bearer. Then I have the Winter Oporto. I have a yellow apple; its name I do not know, but a good bearer; fruit fair. I have Red, Yellow and Sweet Anis; trees young and shy bearers.
5. I do not know correctly, but in 1886 I think I had twenty-five or thirty bushels.
6. Hazel brush or clay soil.
7. Yes; a spring branch on the north near the orchard; timber on the west; valley narrow.
8. Yes; on the west natural timber; north, willows and burr oaks; east, willows; south, Norway spruce. All around the orchards are rows of evergreens, and some scattering trees in the orchard.
9. The spring branch runs water the year round. The well water comes in at a depth of thirty feet.
10. I have raised Talman Sweet apples, Fameuse, Golden Russet, Ben Davis, and a number of other varieties. The last crop of Talman Sweet, Golden Russet and Snow apples was raised in 1883.

My orchard is on a northern slope; clay subsoil. I pasture it with hogs in the summer, and mulch heavy each other year. By so doing the hogs and mulch keep the grass from the trees. Twenty-nine years ago I set out fifty Duchess trees. I cultivated for three years, then seeded down and pastured with hogs. I have that number of trees yet, all sound and right, and get over two hundred bushels of apples per year.

While I have great faith in some of the New Russians, I have some varieties that bear the poorest apples I ever tasted.

Yours,

WM. SOMERVILLE.

DISCUSSION.

Mr. Fuller. Mr. Chairman, I don't know that I ought to say a word in regard to this, but I have thought several times when I have been hearing these things that if a lot of boys were in here they would say "chestnuts." Sixteen years ago, when I first attended the meetings of this Society, our tables were filled with perhaps thirty varieties of apples, and we had a number of seedlings of the finest quality; and the same things precisely that were said in this essay were said then; and it was reiterated again and again that we must raise our seedlings from our hardy apples. Any of the old members of the Society know very well that we have been running down hill ever since then, as far as large apples are concerned; we have less seedlings to-day than we had sixteen years ago; we have less apples. I don't speak of this discouragingly; I always answer when people say "Are we ever going to raise apples in Minnesota?" by saying "I hope so;" I feel like still trying. But it seems to me entirely useless to reiterate, again and again, these theories, unless we can show some results for them.

Now, a year ago last fall we had some splendid seedlings at our State Fair, and I don't know when I have seen them excelled. But a few days afterwards Mr. Sias and myself went down to see the trees. Well, it shows the difference, perhaps, between Mr. Sias and myself; I may be disposed to be over-critical and to look for the faults in a thing; but as Mr. Sias would open his eyes so widely at those "splendid apples," I said, "Mr. Sias, look down here, that tree is dead." And there it was, rotten all through the sides and half the limbs; the tree was already killed.

So with all these seedlings; this Peerless seedling may accomplish something, but if it has been growing so long as Mr. Brand states, why haven't we some results from them? Let us graft it and see what it will do under other conditions, and before we reiterate it again let us have the results.

Now, there is our friend Gideon out here, who talks so hopefully; his Wealthy apple is failing. And I don't know to-day—except in our favorable points in our State—of a single apple that will stand; I know it is so at least in our section of the State. I believe in telling the truth about these things, and not deceive ourselves or deceive others with these grand platitudes that mean nothing. I believe in experimenting with these things hopefully, and doing the best we can and not saying much about it until we get a few results. [Applause.]

Mr. Pearce said he believed in the principle illustrated by the story

of the preacher who delivered the same sermon repeatedly—to continue preaching the same sermon until he got the people to “act.” The planting of seedlings had been advocated for thirty years, and when the advice was heeded they would then have fruit.

Mr. Sias said as Mr. Fuller was a Bible student, he wished to call attention to the fact that a tree is known by its fruit. The tree alluded to was Hart No. 1. On the occasion referred to the ground was almost completely covered with large, fine fruit, larger than the Baldwin or Ben Davis, and resembling the latter, and the tree was very well loaded. It was closely environed with willows and wild plums, and showed injury from blight, but was living to the very tip buds. If such fruit could be raised only on “dead trees,” he favored planting that kind. This tree had been very productive and began to bear when seven years old.

Mr. Fuller said Mr. Brand had fallen into the error of judging the good or bad character of a tree not from its hardiness but its fruit.

Mr. Harris said he had seen the Hart seedling before the last hard winter and found it injured on one side from rabbits, a plow, or some other cause, which was sufficient to destroy the Duchess or anything else. He did not consider it as hardy as some other seedlings, but had found sound wood upon it on examination after the recent hard winter, and it was somewhat hardier than Wealthy.

He could not agree with Mr. Brand that Duchess was the only Russian variety that was hardy; from the great number of varieties discovered by Prof. Budd and Mr. Gibb several could be named that were hardier. Hibernial, with Mr. Tuttle of Baraboo, was the finest of all in his orchard; the tops come out and make a beautiful tree, and he has two trees without a blemish; it is bearing well and the season is December. It is hardier and may be better to propagate from than Duchess. By growing seedlings we may hope to develop a pomology that will produce the finest fruits on the continent. The time is coming when Minnesota will have an abundance of fruit of her own, and some to supply Eastern markets. Let us test these Russians, for there may be many valuable varieties among them. He had tried over three hundred varieties to ascertain if there were any of the old varieties that were hardy. He made more money from Talman Sweet than any other one variety, but many never paid first cost of the trees.

We have had something unusual in our winters the past three or four years. The first injury to trees the season of 1884-5 was about the sixteenth of November. Mr. Lord, of Minnesota City, called at-

tention to that fact, and we examined a lot of trees and found two-thirds of them injured before there was any frost in the ground. In February and March there was a number of summer-like days when the sap came up and the thermometer again ran down suddenly to zero point, causing a further injury to trees.

Mr. Smith. Have you ever known a similar combination of circumstances before?

Mr. Harris. No. And I wanted to mention the wholesale slaughter of trees in 1872-3, when the cause of injury was root-killing. That winter Duchess and other hardy Russians on their own roots were injured more badly than native varieties.

Mr. Thompson. Mr. President and Fellow Horticulturists: I have come up here to try and learn something, but I find that your Society or the most of its members are different from ours. We should benefit by the exchange of ideas and from each other's experience. In the first place, our friend over there and several others, seem to be of the opinion that if they don't see and feel and know, and have it right in their hand, they won't believe anything. The only way to do is as the schoolmaster did with those who didn't believe in the North Pole—pound it into their heads some way or other. I am a seedling man; and here I want to quote a few sentences from the report of the pomologist, Mr. Van Deman, and from Dr. Hoskins, of Vermont.

Speaking of his visit to Arkansas Mr. Van Deman says: "One thing that interested me particularly was the large number of seedling apples of high quality; I think fully fifty varieties were shown that were entirely new. Some of these are worthy of further trial by experimenters, and a very few are described and illustrated in this report, as well as some already somewhat known."

To save time I want to read further and let you know that you have the best apple in the whole catalogue, originated right here by your own door-step. You say prove it; well, I read from what Dr. Hoskins says, along towards the last of this same report.

"But the future leading winter market apple of the cold North must surpass Scott's Winter in size and in dessert quality, and I am anxiously looking to Mr. Gideon's extensive orchards, produced under his system of crossing, for the desired apple. He has already announced a seedling of the Wealthy almost duplicating its other qualities, with a longer season, which he calls the 'Peter;' and I believe he, or some other Northwestern experimenter, proceeding on the same principle, will soon give us a Northern equal (or superior) to the Baldwin. This is alone needed to give the cold North the lead in orcharding, for it is

a well ascertained fact that the long days of our Northern summers are in the highest degree favorable to that combination of high color, delicate texture and fine aroma which sells an apple in the markets of the world. Already the Wealthy is being shipped to England from Canada with profit, and a long keeping Wealthy is all that is now required to become the leading commercial apple of America."

You want something better! Why don't you use what you have, farmers? [Laughter.] And in addition to that try experiments, every one of you. Plant the seeds of every good apple that comes in your way; save the good and discard the unworthy. If we are to produce good apples we must originate them from a combination of native seedlings and New Russians, to supply every quarter section with orchards, in Minnesota and Wisconsin.

Mr. Dartt. I don't know as I would say a word on this question only for a sort of fellow feeling I have for my brother delegate from Iowa.

Mr. Thompson. Be a little careful you don't get me into such a scrape as you did when we roomed together at Dubuque. [Laughter.]

Mr. Dartt. I would say that I have hopes with Mr. Harris of getting hardy varieties of apples, but I don't believe in these theories that we have them now. It is easy to take the ground of our friend Pearce; on the theory perhaps that a lie well stuck to is as good as the truth. [Laughter.] If this theory will win I have no doubt we will have lots of apples in Minnesota. That may be so, and perhaps I had better not say anything more.

Mr. Sias. Mr. President, I desire to say just a word of [this paper of Mr. Brand's. I notice that he gave us some valuable statistics in the first part of it. In the last part there was something objectionable, to the effect that we have nothing from the old country but Duchesses that are valuable. Let us look at that point a moment; doesn't it seem a little singular that we have imported five hundred varieties from Russia and that this is the only one among the number of merit?

Mr. Thompson. There are over 1,700 I think in Prof. Budd's list.

Mr. Sias. Yes; it seems to me very improbable that Duchess is the only valuable variety. It reminds me of the Know Nothings who wanted to put none but American born citizens on guard—a very grave mistake, indeed! We admit Duchess is of foreign birth, and it stands at the head of the list. The cut-leaf weeping birch stands at the head of the list of ornamental trees; and for general cultivation there is nothing better than the Norway spruce. We must not be too selfish, and we do not want to go from this convention leaving the

impression as the sense of this meeting that there is nothing among those 1,700 varieties that is good for anything. Let us test them a little further. We have many varieties hardier than the Duchess and there is no doubt about it. This discussion would appear much better in Southern Iowa, Illinois or Kentucky.

Mr. Dartt. If we have found but one valuable apple in over 1,700 does that class them in a very favorable light before the people?

Mr. Sias. I do not admit we have found but one good variety among that number.

Mr. Harris. I contend that they haven't had a fair show.

President Elliot. I have been very much amused to see how this paper has stirred up the animals, especially the Russians, this great Northern Bear. Brother Fuller asks the question why we are always tinkering at this seedling question. We have got to keep this thing before the people, or we shouldn't accomplish anything. Out of a great deal of brush we may find something of value. We are going to get something, and in this method, if no other, I hope we shall keep trying, and if we don't secure the object sought for this year perhaps we will in the next one. When we look at the vast territory of Russia and see how they have succeeded it should give us hope that we may be fully successful.

Mr. Smith. Mr. Fuller makes a mistake in saying we have less apples now than we had sixteen years ago. I am not an enthusiast in regard to the general planting of apple trees, but I do believe Duchess is the best of anything we have for the people at present. We have to-day more than ten times the number of healthy fruit trees in Minnesota we had ten years ago.

Mr. Dartt. No, we haven't.

Mr. Smith. In the last three years there have been more good, clean fruit trees planted than at any other stage of our history.

Mr. Cutler. I think not.

Mr. Smith. Trees that went through the winter of 1883 and 4 will be worth something. If we continue to plant, as Mr. Harris says, we will soon have an abundance of fruit, for we may not experience such another winter in twenty-five years.

Mr. Dartt. It hits us about every other winter; we got it last year.

Mr. Smith. I have talked with farmers in all portions of the State and believe we are gaining ground. I saw more than a hundred Minnesota seedlings on exhibition at fairs last fall, and there are numerous trees to be found all over the State that bear fruit and do not show much, if any injury.

Mr. Thompson. If we only have faith we shall reap.

Mr. Dartt. Faith without works is dead.

Mr. Thompson. If it wasn't for faith we could accomplish but little. We are commanded to make use of the talent placed in our hands and we must do it if we are to make our farms pleasant, beautify the country and produce healthful food.

Reports were then called for from experimental stations.

EXPERIMENT STATION AT MINNESOTA CITY.

By O. M. Lord, Superintendent.

The season has not been favorable in experimenting with seeds, plants and trees at this station.

Some apple trees that were transplanted and set carefully at the usual depth perished with drouth. Others that were set at the least two feet deep, made a good growth

NATIVE PLUMS.

Of plum scions that were set in good season and with more than usual care, not more than one per cent grew; probably owing to a violent storm of rain, sleet and snow that immediately followed the fine weather when they were set.

A quantity of seed also failed to germinate that had been exposed to frost and planted in the usual manner. The ground has not been disturbed, and they may grow next spring, but a year's time has been lost.

Ten varieties of plums were received from the Iowa Agricultural College; two from Mr. Pond, of Kasson; two from Mr. Brand, of Faribault, and a few others from localities near by, which has increased the collection here to over thirty kinds. Some of these will prove to be valuable for general cultivation; and others, particularly the Chickisaws, will be abandoned; also *Prunus Simoni*.

I would like to call attention here to the remarks of "The Farmer" upon the statement of Mr. Harris, published last spring, in regard to the hardiness of Chickisaw plums at this station. "The Farmer" assumed that the failure of one nursery to carry trees through the winter was no test of their adaptibility to this climate. Mr. Harris was acquainted with all the conditions, while "The Farmer" was not. I would say that this station is not a commercial nursery, and

could have no object in jumping at conclusions. And from the fact that we have heretofore grown in this vicinity grafted and seedling apples and other fruits that have not succeeded in other parts of the State, it is generally conceded that this location is most favorable for fruits not entirely hardy. Add to this the fact that the last few winters have not been considered test winters, and we conclude that when trees winter-kill to the ground here, they are not well adapted to general cultivation when exposed to greater risk.

SMALL FRUITS.

The protracted drouth materially interfered with some of the work in small fruits, and very little was accomplished. One row of Stone's Hardy blackberry was set next to a row of Ancient Briton for the purpose of comparison. Also a row of Cook's Windom Dewberry by the side of a row of Lucretia for the same purpose.

Of grapes Iona, Worden, Moore's Early, Empire State, Massasoit, Lindley and Wilder have been added to the list. The only strawberries set for trial are Crawford's No. 6 and the Jessie.

EXPERIMENTAL WORK.

In regard to the work of experiment stations a superintendent of one of the Iowa stations writes me there is a good deal of burlesque about some of them. Query: May the same criticism, or even a more definite one, be applied to ours? If our critic should base his remarks upon what we have not done, I fear he would have a wide field of labor. If, however, he should carefully consider the difficulties under which we labor, the subject would be placed in a different light. A very few of these difficulties may here be stated as an apology, or excuse, for light work and meager reports. So far as I am acquainted with the experimenters, not one can devote his whole time and attention to the work, and if he could, the results are always doubtful, and the money value thereof (to himself) more than doubtful. We have no organized means of obtaining seeds, plants and trees to experiment with, but have been wholly dependent, so far, on our own resources. We have had no clearly defined system of work, of instruction, nor advice; and the only intimation I have seen as to what is expected of us was in a late number of *The Farmer*. In noticing the call for the annual meeting, it said: "Above all, those present will expect to hear detailed reports of operations at the experiment stations."

In appointing these stations it was understood that the Society de-

sired fruits tested, as to their quality, adaptability and hardiness, and also desired the results to be made known generally for the benefit of those who would plant; but in looking for these reports it would be well to bear in mind that for most fruits a series of experiments, extending over several years, may be necessary to establish their value. If results are given by only one experimenter there is room for doubt whether a thing may succeed or fail when tried by another in a different locality, unless all the conditions are understood in making the tests. It is therefore suggested that the Society establish some system of uniformity of work among the stations, in pairs, or among a greater number, if a larger range is desired for any specialty

EXPERIMENTAL STATION AT ROCHESTER.

By A. W. Sias, Superintendent.

Mr. President and Gentlemen of the State Horticultural Society:

We have now sixteen experimental stations and are anxious for more providing there is another man in the State who is so heavily laden with love for the business that he is willing to "work for nothing and board himself," as Brother Dartt said in reference to extending the borders and increasing the laboring force of the Olmsted County Horticultural Society. In common warfare, volunteers make the best soldiers, while those who enlist for fame or money make the best thieves. Now in this battle for the "coming winter apple" and the amelioration of other fruits, we want superintendents that will work hard for the love they bear the cause, whether paid or not, and leave the responsibility for short comings and poor work at the door of the State legislature.

Our last report shows only seven superintendents heard from. What does this mean, unless it is that it takes money to make the mare go? The majority of these superintendents are men of limited means, and cannot be expected to put much time into experimental work without a reasonable compensation. O. M. Lord struck the "key note" when he made the suggestion that the superintendent at each station be given a specialty for which he was best adapted. For instance, give the superintendent at the State University farm a branch of work that requires the deepest scientific research; O. M. Lord the development of our native plums; Peter M. Gideon to continue the grand work left by Dr. Van Mons, whose "nurseries con-

tained in 1823 no less than 2,000 seedlings of merit ;" the superintendent at Rochester would like to ape Andrew Knight (on a very small scale, of course) and so obtain a cross between the McMahon White and the Autumn Streaked, also cross the Red Cheeked, Red Anis, Antonovka, White Pigeon and Russian Green with McMahon or some better keeper. In other words to make a specialty of hand fertilization. In this way let each superintendent choose a specialty for which he is best adapted. If this plausible scheme of Mr. Lord's could be carried out the whole Northwest would soon begin to see that our experimental stations were made to perform a grand work. C. G. Patten hit the nail square on the head when he remarked: "Gentlemen, we need a Van Mons and an Andrew Knight in every state of the Northwest."

The past extreme winter, and summer's drouth, admonish us of the necessity of clinging to the Russians. This and many other generations shall pass away before they go out of date. At least our experiments point to this conclusion.

Our experience is that the Brandywine raspberry is about what we want. It stands the summer's heat and winter's cold equal to the Turner; yields better with us, and is more attractive on the market. We think it has no peer as a keeper or shipper among red raspberries. Schaffer's Colossal is very large, but inferior to the Brandywine as a shipping berry.

The Jessie strawberry has only been with us one season, but looks very promising; but as we are never satisfied short of perfection, we propose to fruit a seedling from the Jessie as soon as possible. The Manchester was one of the very best with us this year. Old Ironclad, best of the early varieties.

The Windom dewberry behaves better than the Lucretia. Shell-bark hickory trees grown from seed raised on the grounds of J. S. Harris in Houston county, now two years old, are likely to stand the racket.

EVERGREENS.

The thirty varieties of evergreens on our experimental grounds, prove to us most conclusively that Minnesota, any part, is the genial clime and soil for evergreens. The Norway Maple and Sycamore have proven too tender. The Rocky mountain conifers from D. S. Grimes of Denver, Col., and from Robt. Douglas, of Waukegan, Ill., are doing finely.

The Rockford plum from C. G. Patten, is fine. Fay's currant is a

failure with us. The plants from Chas. Luedloff, Ostheim cherry, weeping willow from Europe, the new lilac, philadelphus, etc., are all doing nicely. We had a round bed of thirty or forty *Hydrangea paniculata grandiflora*'s all in bloom at one time that made a grand display.

EXPERIMENTAL STATION AT LA CRESCENT.

By J. S. Harris, Superintendent.

Mr. President and Fellow Members :

My report of the work of last year shall be very brief. I think I am making progress slowly.

The few varieties of Russian apple trees heretofore reported upon came through last winter all right. The variety I suppose to be Ostrokoff Glass, Antonovka, Orel and two or three varieties of the Anis, are making the most satisfactory growth. One tree of Anis, bore one specimen of medium size, green and red striped; quality excellent, ripe September 10th.

Have added to my list of Russian apples for trial: Yellow Transparent, Early Glass, Repka, Lords apple, Juicy Burr, Red Cheeked, Beautiful Arcad, Switzer and Vargil.

Plum trees bloomed freely but did not mature any fruit. I have added one variety of Russian plums.

Owing to the drouth and an attack of sickness when my trees needed most attention, some of them failed to live, and none of them have made a strong growth; so if they kill out this winter I shall not attribute it to the varieties, or blame the parties I procured them from. I have also added six trees, one year old, of Hotchkiss Seedling; all lived and doing well.

Russian pears did not kill out, but are not making a satisfactory growth. The same may be said of Salome apple. The celebrated Mann apple again killed to the ground and it is useless to try it longer. Have one tree of the Gideon apple; it did not winter kill but was bark burnt by the October freeze.

The Niagara grape is not doing well with me. It drops its foliage too early. Shall try it again with new plants.

I now have good facilities for conducting experimental work, and will promise to take charge of and give a fair trial to any new varieties of fruit sent to me and make impartial reports upon the same. Promising varieties of native plums are especially desired.

Thanks are due to O. M. Lord, Chas. Luedloff; Carver, Dewain Cook, and Joe Wood, Windom; S. D. Richardson, Winnebago City, and J. O. Barrett, Browns Valley, for favors received.

EXPERIMENTAL STATION AT FARIBAULT.

By O. F. Brand, Superintendent.

This station is on comparatively high timber land. The surface soil is a deep, rich, black loam, underlaid with a yellowish and blue, porous clay subsoil; soil naturally moist; exposed to west and south; protected by higher ground north and east; the valley of the Strait being less than a mile west and less than a mile south; the river being about 150 feet lower than our station.

Here we never have been able to raise a good tree or get fruit of any account from Fameuse, Perry Russet, Golden Russet, Haas, Red Astrachan, or Talman Sweet. Such early bearing sorts as Price's Sweet or Wealthy have borne one good crop as young trees and then died.

In 1877 we planted about one thousand two-year-old Wealthy which nearly all died in 1884. In 1875 we budded a large number of crab trees with Miller's seedlings of the Duchess; all of the crab trees on which we budded were killed with blight, except two Beaches Sweet; those two are fine, large trees and have borne fruit for nine or ten years. One of them is an apple a few days later than Duchess and not quite as large; less acid than the parent, but otherwise almost an exact reproduction of Duchess. An examination since the extreme cold of Jan. 21, 1888, (48° below zero), and also since the thaw which has taken place since the extreme cold, shows no perceptible injury to the wood. The original tree of this variety, now about twenty years old, is still in good condition and a heavy bearer. The other tree bears an apple very much like the Janet, and seems to be equally hardy. In quality it is third rate or about like Lieby or Hibernial, as known to us. The young trees of this variety are as hardy as Duchess. It forms a low, spreading top, similar to Leiby. We have one seedling about nine years old which bore a fair crop in 1886. The fruit is nearly as large as Fameuse, of fair quality, about a month later than Duchess; seems to be crab wood.

We also have a crab or Hybrid thirty-two years old, called the Berry, named after the originator, the late Hon. J. M. Berry of Minneapolis. The fruit is the size of Transcendent, about the same

season; handsome and better in quality. The tree is fifty-two inches in circumference and thirty feet across the top. It is a true ironclad.

We have one tree of Drake apple, top worked on a seedling crab. This tree bore more than a barrel of fine apples in 1886. The original Drake was a seedling near Northfield, grown from seed from New Hampshire about 1856 or 1857. It was dug out as worthless in 1873. Our live bearing Drake is the only one left of several fine top-grafted trees; and the reason why it is a good tree is because it is on a hardy stock, and has formed a low spreading, heavy top to the southwest, that shades the forks of the tree from the sun.

Of the Peerless apple last spring we used it to top-graft seven varieties of crab apples besides putting in a few hundred root grafts. All the top grafts made a good growth and we will be able to report upon it more fully after another season's growth.

RUSSIAN APPLES.

We received from the Department of Agriculture in the spring of 1873, sixty-five varieties of New Russian apples. Some of them I top-worked on bearing crab trees and the rest were stock-grafted close to the ground on four-year-old seedling crab trees. All of those top-grafted on bearing trees came into bearing but soon killed with blight. Some of them were on the Berry crab, above mentioned; not one was left in 1879. Of those grafted at the ground nearly all came into bearing but soon died—with blight or cold. Most of them bore fruit of a worthless character. Four trees are still alive, two of them bear a small crop of worthless apples. One bears a few very small, early apple, not so large as Transcendent; a very fair fruit for its size. The other is a very fine tree but bears only a small crop of fair-sized sweet apples. There were two fine trees of Longfield that bore a fair crop in 1882, but killed in 1884; were badly injured in 1883.

In the spring of 1883 we set out one hundred two-year-old trees received from Prof. Budd. There has not been a blossom on any one of them yet, and but few if any of them will stand this climate. At the present time they do not look as though they were adapted to this latitude.

Last spring we transplanted about seventy-five seedling Duchess into orchard rows. These trees were grown from seed saved from Duchess apples which were latest in ripening. Every tree made a good growth last season. A few months more time is necessary to enable us to see what effect 48° below zero has had on newly transplanted Duchess seedlings.

We have about thirty seedlings from Peerless, many of which show a good leaf, but they are only one year old; still it is possible that some one of them may become prominent in some future report. We have about forty good bearing trees of Tetofsky left, out of 150 grown from root grafts, set in 1870 and 1872. The greatest loss among them was in 1884. We have never lost any Duchess, and have seven trees that have been growing in our orchard twenty-one years.

We have used evergreens freely for protection and windbreaks, hundreds of which are more than thirty feet high. We strongly recommend the use of evergreens around every farm home. White Spruce, White Pine, White and Red Cedar, and on moist or clay soil the Balsam Fir. The Norway Spruce is not desirable in the windy prairie portion of the State. The Scotch Pine is valuable both for timber belts around fields and for fuel. We have learned that a dry round stick of Scotch Pine eight inches in diameter will keep fire in a heating stove longer than a stick of hard maple of the same size. That is something worth knowing.*

EXPERIMENT STATION AT LITCHFIELD.

By G. W. Fuller, Superintendent.

The Russian apple trees obtained from Prof. Budd in 1885 have all failed. Of the trees obtained in 1886, the cherries and pears all died or were killed to the snow line. A few varieties have done fairly well, the Hiberna I think doing the best.

The Red and Yellow willows and some of the poplars promise very well. I cannot but doubt that we shall obtain from them some valuable additions to our forest timber.

REPORT ON FRUIT.

Our crop of apples was very small, only a few Transcendents; and these were mostly grown on a few orchards in the timber. The few raspberry bushes we have bore exceedingly well, especially where the canes were buried. Gooseberries and currants bore less than quarter of a crop. The strawberry promised very finely in the early part of the season, but the dry weather diminished the crop very much; still our strawberry crop was the largest we ever had.

EXPERIMENT STATION AT CARVER.

By Chas. Luedloff, Superintendent.

With great pleasure I send my report of results in horticulture the past year. I begin with the apple as our leading fruit. I cannot say much about the fruit crop, because the old trees are all dead, as they are also in the surrounding neighborhood. Next spring I will replant, for a new beginning, with one and two-year old Russians.

The little Russians I experimented with last year suffered greatly from the effects of drifting snow, most of them being broken down. I had to cut them back, but most of them made a growth of four feet and over, in a very dry season, none of my trees blighting. There is a prospect of getting more durable trees from the Russian kinds than from Minnesota and Wisconsin seedlings, as the latter kinds do not ripen their wood early enough to enter the winter in good condition; most of my seedlings were lost on account of this.

It is evident that a seedling may flourish and bear well in its native place for many years, but when propagated and transplanted in a different soil and location, it may prove to be a failure.

All new seedlings recommended to us should first be tested at every experimental station, and we must also test the Russian in the same way. In this way we will reach the point we are seeking sooner, and find the hardiest kinds for general planting.

My plum crop was good, but the fruit was not as large or of as fine a flavor as in previous years. Most of my trees are the best of native and seedling varieties; besides these I have under culture the Weaver, De Sota, Newton Egg, Peach, Forest Garden, Miner; Wolf and Speer are new. My Russian plums not being quite as hardy, I cover them, as I wish to use them for crossing with the natives, and, if it is possible, to get a kind with firm flesh that will be good for drying.

The strawberry crop was poor; the first picking was middling; after this the berries were small and of a poor flavor, the plants were nearly dead on account of the drouth, but happily on the first of July we had a heavy rain, more following later, and before winter the plants were in a splendid condition, with a good prospect for a fine crop next year.

My grape crop was fine in quality and quantity, over thirty kinds bearing. The best are Barry, Rogers No. 43, Rogers No. 33, Brighton, Beauty of Minnesota, Eldorado, Worden, Rochester, Duchess, New Haven, Green's Extra Early and Martha. But it should be stated as

a fact that no one grape is suited to all localities; neither is there any one locality which is suited to all grapes; this must be determined by experiments.

The blackberry crop was short. Snyder was small and sour; Ancient Briton was much better.

ORNAMENTAL AND FOREST TREES.

Ornamental trees should be planted on a larger scale around dwellings, school houses, churches and in public parks, and thus beautify the country.

But we must not neglect the replanting of forest trees to take the place of our destroyed forests, and also the planting of new forests, that the climate may be healthy and productive. I give a list of the kinds I find to be adapted to our climate:

Acer campestre. A small, stocky tree, small, handsome foliage.

Acer Wier's lancineatum. Wier's cut leaved silver maple. It is a variety of the silver leaved; shoots tender and drooping; one of the best lawn trees.

Acer platanoides. Only hardy enough in shady places.

Acer atropurpureum. Cut leaved purple Japan maple; foliage dark purple and deeply cut; very ornamental; stood the last two winters very well.

Acer polymorphum atropurpureum. Blood leaved Japan maple, bushy shrub and dark purple, deeply cut leaves; very fine; stood the last two winters well.

Betula alba fastigata. Pyramidal birch of elegant pyramidal habit, like the Lombardy poplar.

Betula alba. European white birch of rapid and graceful growth, and having silvery bark; after the trees get to a moderate height the branches droop.

Betula pendula laciniata. Cut leaved weeping birch. One of the best of all weeping or pendulous trees, with finely dissected leaves and white bark.

Betula atropurpurea. Purple leaved birch, having purple foliage; stood two winters well.

Catalpa speciosa. Western Catalpa. Did well in sandy ground and timber.

Larix European. European Larch. An elegant, rapid, pyramidal tree; small branches drooping; should be more of them planted for timber.

Populus alba Calleana. Similar to the lombardy, with silvery cut leaves; very ornamental.

Populus Petroosky. *P. beroelensis*. *P. pyramidalis fastigata*. *P. pyramidalis Siberica*. *P. laurifolia*. *P. certinensis*. Fine ornamental and timber trees.

Populus monilifera Van Geerty. With yellow leaves.

Pyrus acuparia. European mountain ash; a fine tree, covered from midsummer till winter with great clusters of bright, scarlet berries.

Quercus bicolor. *Q. coccinea*. *Q. palustre*. *Q. prinus*. All do well in our climate.

Quercus pedunculata. From Europe; growth more rapid than our white oak; in wood it is just as good, and should be largely planted for timber.

Salix laurifolia. Laurel-leaved willow. A fine ornamental tree, with very large, shining leaves.

Salix rosmarinifolia. Rosmary-leaved willow; foliage silvery.

Salix purpuria pendula. For weeping it must be grafted on some stock five to seven feet high.

Salix regalis. Royal willow; a fine tree, silver foliage.

Salix fragilis. A rapid growing tree, for timber.

Salix Kapoleanis. A fine weeping when grafted on some stock.

CONIFERA AND EVERGREENS.

From the many kinds I have experimented with I find hardy for our climate as follows:

Abies Douglas. *Abies alba*, *Abies nigra*, *Picia concolor*, *Pinus cembra*, *Pinus massoniana*, *Pinus resinosa*, *Pinus munhus*, *Pinus ponderosa*, *Abies pungens*.

Juniper Sabina. *Sabin Juniper*. A dwarf spreading shrub, suitable for rock work.

Juniper tamariscifolia. For rock work.

Juniper squamata. Scaled juniper; fine for rock work.

Juniper Venusta. A rapid grower with fine, silvery foliage; very ornamental, the best of all.

Thuja burrowii. *Th. compacta*. *Th. Geo. Peabody*. *Th. globosa*. Little Gem. Tom Thumb. All of dwarf, compact growth.

Thuja Siberica. Siberian Arbor Vitæ. Is the best of all the genus of this country, keeping color in winter; grows compact.

Thaja pyramidalis. Douglas pyramidal arbor vitæ; pyramidal in form. foliage distinct, like a *Petinispora*.

Petinispora rurea. Beautiful golden-tipped foliage; needs a little protection.

THE CLIMATE OF MINNESOTA.

By Chas. Luedloff, Carver.

Has the climate of Minnesota changed since the first settlement?

Yes, since the virgin soil of Minnesota was first opened to agriculture and horticulture there has been a great change in the climate. Our water supply is gradually becoming less, in lakes, creeks and rivers. Our creeks formerly full are now dry most of the year; the water in lakes and rivers is slowly receding, the banks and the shores being broader and higher. The sloughs not ditched becoming dry, the wild grass dying, making it necessary to sow tame grass, so that we may have food for cattle. Our rivers formerly navigable almost to their sources, can now be navigated for short distances only, the low stage of water and snags stopping navigation or making it dangerous. This increasing dryness is dangerous to the interests of agriculture and horticulture as well as manufacturers.

Now a word about its effect on fruit culture. As examples of our first immigrants in the apple were Plumb Cider, Haas, Perry Russet, Golden Russet, etc. These all did well for a while then they died. After them the Lezion crab was tried, which did well for a time; then the blight destroyed them. Now we are sifting out the hardiest kinds of Russians and seedlings. Some of these are standing well but how long will they flourish in this dry climate?

What is the question? I will give you my opinion. The temperature of the climate is controlled by the moisture in the air; moist air breaks the extremes of heat and cold, as we can prove by referring to the coast section.

A person living where the air is very dry is subject to the extremes in temperature during night and day. In the dry air of the desert after sunset the temperature falls very quickly, until ice is often formed during the night. This proves that there is a lack of moisture in the air.

Now, let us look at the climate in a timber region. There the air contains more moisture. During every month of the year there is

more rain and dew. The timber breaks the wind—makes the summer cool and the winter warmer.

Everybody must admit that our timber is fast disappearing, and we must take care that we do not reach the point that some countries of Europe and Asia have. There the timber was ruined, the climate changed, the rainfall decreased, cereal products became less, and farm industry was at a stand. We should make application to our legislature and to Congress to pass laws to protect our timber and replant our forests. Then the time will come when our climate will be improved, and agriculture and horticulture will flourish.

REPORT FROM WINONA COUNTY.

By O. M. Lord, Minnesota City.

The yield of small fruits for the past season was considerably below the average owing to the drouth. Beginning with strawberries the quick sandy soils produced a fair crop of the early kinds, but very few of the late ones matured. The main market supply of Winona is produced upon clayey soils, which being naturally later produced a very light crop.

Red raspberries blossomed abundantly, but continued dry weather injured them beyond recovery. The kinds principally in the market were Turner and Cuthbert; the retail price was quite uniform at 15 cents. Blackcaps were shriveled in appearance and of poor quality.

Currants may be put down as an entire failure. Blackberries bid fair for a full crop in the early part of the season. The bushes were loaded with fruit which literally dried up on them without ripening.

Grapes were considered a fair crop, both in yield and quality. The market was at all times well supplied, and the prices lower than usual.

APPLES.

The Duchess in some few places produced fairly, sufficient to nearly supply the market, and different kinds of crab apples were abundant.

Wild plums were not offered for sale in plenty as usual. The trees in some localities did well, but from the failure of other fruit more than common were kept for home use. Prices ranged from one to two dollars per bushel, though the fruit was not of average quality.

What effect the excessive drouth may have on the next crop it is difficult to determine. Some predict a failure from the supposition

that the vitality was too much lowered to properly form fruit buds. Others hold that what vitality they possess is expended in the perfection of fruit buds, as the only means of perpetuating the species, and that we may confidently look for a fruitful season after an unusually dry one, if favorable weather supervenes.

REPORT FROM WINONA COUNTY.

By S. A. McHenry, St. Charles.

On account of extreme dry weather the strawberry crop was very light and quality poor. Windsor Chief, Parry, Crescent and James Vick were the leading varieties. Raspberries were a fair crop, good quality and generally sold at a paying price. Turner and Schaffer's Colossal were the best of the red varieties and the Taylor and Elmira best of the blackcaps.

Blackberries, where properly mulched, were a good crop, but where not mulched were somewhat injured by the drouth. Quality and price were generally fair.

Grapes were the best they have been for years. Moore's Early ripened first, but all varieties ripened before frost. Delaware and Concord were very heavily loaded.

Apples yielded well, but the quality was not as good as last year. The dealers here shipped 1,240 barrels the past season.

It is now generally admitted throughout this section of the country that small fruit can be successfully grown here. Most of those now in the business are enlarging their plantations, while many more are beginning. Windom dewberry is attracting considerable attention in this vicinity, and we are in hopes that it will prove of great value on account of its hardiness and productiveness.

REPORT FROM HENNEPIN COUNTY.

By M. Pearce, Minneapolis.

The past season was very dry. The grape crop here, comprising Concord, Worden, Delaware, Niagara, Brighton, Cottage, and Roger's Nos. 4, 15 and 29, together with several other varieties were very fine, ripening in good season and yielding abundantly.

All the raspberries that were protected during the winter and had

proper cultivation, also did well. The same is true of blackberries and strawberries. The Turner and Cuthbert were the best varieties of red raspberries, and the Gregg of the black varieties. Of the blackberries, Ancient Briton and Snyder; strawberries Wilson and Crescent; currants Red Dutch and Stewarts seedling.

APPLES AND CRABS.

Crop very light; blasted in the blossom. The trees made a good growth, but most of them were more or less injured by the previous winter. The wood of Wealthy, Duchess, and most of the Russian colored crabs and hybrids wintered well. About fifty seedlings of the Wealthy, three years old were not injured in the least.

NEW SEEDLINGS.

Victor, three years old, thirty trees, not injured in the least. This variety has fruited with us for six years. Fruit medium in size, striped, sub-acid, juicy; of the very best quality. Season, September and October. We have great faith in this variety. It is now on trial at various points in Minnesota and Dakota.

Unknown, a Russian variety ten years old, has never been injured. It is a rapid grower and an immense bearer; fruit as large as Wealthy and keeps as long; striped; a good second quality.

Tonka, a hybrid grown from a cherry crab; supposed to have been fertilized by Duchess. Fruit flat, red, larger than Transcendent, and ripens after that variety is gone. Very juicy; sub-acid, no crab quality; a prolific bearer, and never water-cored. Tree hardy; has never blighted. It is being tested at various stations. We expect good results from it.

We are satisfied from years of experience that it is useless to expect a full crop of good strawberries, raspberries, or blackberries without proper winter protection. During the last three years we have given all our plants winter protection, at a small cost, and the good results secured were far beyond our expectations. We are satisfied that the great problem of small fruit growing in Minnesota is solved.

REPORT FROM WASHINGTON COUNTY.

By M. C. Bunnell, Newport.

Mr. President, Ladies and Gentlemen:

Allow me to say that I have had but little time to prepare my report, and so you must not expect anything very elaborate. As to the

growing of fruit in Washington county, more especially standard apples, I find many among the farmers who are discouraged about replanting where their trees were killed three years ago by the hard winter. They do not stop to think that the varieties they were accustomed to raising in Southern Wisconsin and Northern Illinois (even as far south as the central part of the latter state) were injured during the same months in those localities, and that, if one would keep his orchard up, so as to receive benefit from it, he must renew his trees occasionally. Perhaps if they would become members of our Society they would learn from the experiences of others, gain more courage and not be so disheartened about apple growing in Minnesota.

CAUSE OF FAILURE.

Too many trees are carelessly planted, put in narrow, contracted holes, and not enough fine earth worked in among the fibrous roots, thus setting them firm in the ground. Also, not mulching after planting, but leaving the trees to take care of themselves; the planter, however, hoping some day to pick and eat apples from his trees. But, alas! he will be doomed to disappointment. They perhaps never leaf out. What comes next? Why, of course, he condemns the tree peddlers, as they are termed; or, if he can't attach blame to them, he goes for the climate, and concludes that it is no use to bother with apples in Minnesota.

I know that tree agents, as a rule, have great notoriety wherever they travel; but still I think they are quite useful at times, to get around among the farmers and stir them up to the idea that some sorts of fruits ought to be mixed in with other products of their farm, and that they ought not be confined to vegetables and animal food altogether for a living. No one denies but that ripe fruit is healthy for anyone to eat, and promotive of the welfare and happiness of mankind. One old patron of mine, whom I was stopping over night with, says: "I presume I shouldn't have had an orchard if it hadn't been for the agent." The careful planter, loses his trees, some times, through the effects of climatic changes; but he is generally ready to give an order to an authorized agent of a good, responsible company for more, for the purpose of keeping up his orchard.

HOW TO PLANT.

As to the best method for purchasing and planting trees in Minne-

sota. In the first place patronize those agents who can show you a certificate from a responsible company, and give you honest information regarding the hardiest varieties, and most farmers do prefer to buy from one who can give them information as to varieties, planting and care of trees.

For apples, select a northern slope, if you can get it convenient to your buildings. Then obtain the Duchess and Wealthy with a sprinkling of hybrids, viz., Whitney's, Early Strawberry, Orange, Transcendent, and Hyslop. It might be well perhaps to try some of the New Russian varieties. Clay soil or a rocky soil is preferable to any other. Dig good sized holes, planting the trees two or three inches deeper than they were before being taken up out of the nursery. See that your earth is put in well around the fibrous roots and packed firmly. After planting mulch well and keep your stock away from the trees. Plant plums in groups, as they bear much better in clusters, selecting DeSota, Weaver and Forest Garden.

For grapes, select a south or southeast slope, fertilizing with a rich compost. Old bones are beneficial if put around the roots when planted. Plant six to eight feet apart. For trellis use posts with three wires. Prune and lay down in the fall about the first of November, and uncover about the first of May the following spring, putting them upon trellis. You will be amply rewarded for your time and expense.

SMALL FRUITS.

For raspberries select Gregg's Mammoth Cluster for black; Cuthbert, Turner and Philadelphia for red. Plant them in rows six feet apart and four feet between hills; cultivate well and keep suckers from spreading. Mulch well. Of the red, after they are through bearing, cut out all dead canes, leaving about half a dozen new canes in the hill to be laid down in the fall for winter protection. In the spring take them up cutting them back to $3\frac{1}{2}$ or 4 feet. I think if you adopt this plan you will be sure to get a good crop almost every year.

For strawberries select good soil and cultivate well the first year; putting the plants $3\frac{1}{2}$ feet between the rows and 18 inches to two feet in the row. Fertilize the pistillate varieties every third row with a staminate variety. Wilson, Crescent, Manchester, Chas. Downing, and Windsor Chief do well in Minnesota.

Currants, planted on good soil, can be raised very readily. Give them plenty of manure. Select such as Red Dutch, some Cherry,

White Grape, Black English, etc. For blackberries select Stone's Hardy and Ancient Briton.

In conclusion I will say that in Washington county I did not find many standard apples in bearing the last year, owing to the old trees being killed three winters ago, and those that have been replanted are not far enough advanced to bear yet. Transcendent and Hyslop bore some. One man by the name of Gilla, eight miles from St. Paul had some fifty bushels of Duchess, which he marketed at a good price in the city. I think the Whitney will give general satisfaction as more of them come into bearing. Quite a number of Early Strawberry are in bearing in different sections, which suit the tastes of most people. Some are commencing to plant the New Russian varieties.

The plum crop was a failure in this section, owing I think to the hail storm we had in April. Grapes were quite a profitable crop and bore in abundance where they were well cared for. Currants, raspberries and strawberries were all good crops, and commanded a pretty fair price.

I trust, as members of the State Horticultural Society, that our practical knowledge in fruit growing in Minnesota may be disseminated to others outside of our Society, which is calculated to make mankind healthy, wealthy and wise.

REPORT FROM CHIPPEWA COUNTY.

By O. E. Saunders, Granite Falls.

I have no very flattering report to give, as the fruit crop was very light. The causes that produced the failure, or partial failure, were such as are liable to occur in any country or climate. Just at the time when currants, gooseberries and plums were in blossom, a heavy southeast wind prevailed, which removed the pollen, or from other blighting influences prevented fructification, so these crops were almost an entire failure.

There was no rain in the spring, so that transplanting was not successful, save when done very early. Strawberries, although affected by drouth, made a fair crop. Raspberries were badly dried up.

Blight was uncommonly severe upon apple trees, scarcely a variety of standards or of crabs escaping its withering influence. From present indications it would seem to be time and money thrown away to plant any of the old sorts of standards. Quite large sales from the

nursery of Peter M. Gideon were made this fall, and we hope varieties approaching ironclad have been introduced.

The grape vines received from Prof. Porter succeeded well, making a healthy growth.

We think the growth of all fruits last season was healthy, and went into winter quarters in good shape, which, with the depth of snow covering the ground, would warrant the hope of their coming out in good shape in the spring.

Much difficulty was experienced in securing the germination of garden seeds, and many gardens were nearly failures on this account.

The heavy winds that prevailed in early spring blew the seed entirely bare on many a grain field, and in many cases reseeded was resorted to, and in many more it should have been.

Increased attention is being given to small fruit culture, which is a hopeful indication.

REPORT FROM NICOLLET COUNTY.

By C. F. Brown, St. Peter.

As per request, I hand in a rough report of fruit for the county for 1887. Could have made it more elaborate, perhaps, but have been pressed for time.

I cannot give a very flattering report of the fruit production of this county for the year 1887. On account of the drouth, fruit in general has done very poorly.

SMALL FRUITS.

Strawberries on one year vines produced a very fair crop. Old vines did not do well.

Raspberries, a short crop, but usually do well with good care.

Blackberries coming into bearing so late in the season felt the effects of the drouth very severely, and were a failure.

Grapes were a good crop and of excellent quality. Col. J. C. Donohew has kindly given me a list of those raised by him last season, which demonstrates that, under an intelligent management, in a favorable season quite a variety can be produced, to-wit: Brighton, prolific and very satisfactory; Worden, prolific and very satisfactory; Moore's Early, prolific and very satisfactory; Martha, prolific and very satisfactory; Rogers No. 15; Amber Queen, doing better each

year; White Ann Arbor, not satisfactory; Concord, good; Hartford Prolific, prolific; Wilder, or Rogers No. 4, splendid grape, but drops from vine. He also has other varieties, but has lost names for them.

Apples were a capricious crop; in some localities Transcendents, Hyslops and Duchess produced good crops, though not of the best quality, but generally speaking they were a failure. A few Gen. Grant were marketed. Most of the old orchards have died out, and parties who have been trying to raise apples for the past twenty-five years are discouraged; and many of the "coming seedlings" have gone the way of the "ironclads." Mr. E. Myer, of this county, who is a veteran pomologist, pins his faith (what he has left) on the Duchess and pronounces it the most reliable for this locality. His orchard of Duchess—now nearly all dead—have paid him well, yet he is inclined to let some younger enthusiast carry the fruit banner in the future for this locality.

Currants were a very poor crop, the lightest ever known in this locality.

I am not a practical fruit man, and only have a natural inclination and love for the subject without a chance to put my theories into practice.

REPORT FROM MURRAY COUNTY.

By O. F. Norwood, Balaton.

The past season, although a little dry, was on the whole a favorable one. The few trees scattered over the prairies all bear some fruit, and where good care had been bestowed apples were a good crop.

Leonard Aldrich, on the shores of Lake Shetek, raised over one hundred and twenty-five bushels of apples from only a few trees that have fruited three to four years, and sold for over one hundred dollars, besides raspberries, strawberries, and other small fruit, which was plenty.

With us fruit was about the same as last year, grapes being a good crop and of good quality, but this year I have to report the first appearance of blight on the Transcendent, which killed a few twigs about a foot in length. We planted last spring two hundred trees of different kinds for trial, and every one of them made a good growth and seem to be in good shape at present. The rabbit is the worst enemy we have to apple trees here, and if they are not exterminated there is little use in planting largely of apple trees. I have tried all

remedies I have seen, but nothing avails except wrapping paper around the trees and binding it on well, so the wind will not blow it off.

The conclusion reached after a five years' observation is, that every family can have all the apples and berries they want for home use, if they will plant and care for a small fruit-garden, and can raise fruit to sell if he has the inclination; but it is a duty every man owes to his family to raise all the family needs, and that enough to last the whole year.

THE RABBITS.

I have interviewed many farmers the past week or two, and the general complaint is that the rabbits are much worse this year than ever before, and that unless the plague is done away with it is useless to plant apple trees, as in many places every tree is entirely destroyed.

I take it for granted that the same trouble exists all over the State, and that something ought to be done to at least diminish the numbers of this, the worst enemy to fruit trees. Would it not be advisable to have a law enacted placing a bounty of, say, twenty-five cents a rabbit? This would do away with them on short notice, and cost no more than a smaller bounty extending over a longer period, thus costing as much in the end.

REPORT FROM MURRAY COUNTY.

By John Fitch, Tracy.

I have an orchard of eighty-five trees set about eight years. Of these twenty-five are Duchess, a few of Wealthy, Transcendent, Hyslop, Early Strawberry, Orange, etc. The orchard commenced bearing about four years ago, but it was nearly destroyed last season by the snow and sleet breaking down the trees.

Wealthy has proved very hardy. I lost about five per cent of my trees from drouth the first year, but most of the varieties raised have proven hardy. Location on northeast shore of lake Sarah; soil, dark, sandy loam, northeasterly slope; drainage good; sub-soil sand and hard pan. Trees appear to be healthier than on richer land, and freer from winter killing.

Have raised Wilson strawberries with good success; also a few

Mammoth, Bidwell and Sharpless. Mammoth proves to be the best with me. For winter protection I mulch with wheat straw and chaff after the ground commences to freeze. In the spring I rake off the straw and leave between the rows until there is no danger from frost. Have grown some very fine crops, having an abundance for home use and some to spare. Have supplied my neighbors with plants, who are now raising their own berries.

Have several varieties of raspberries. Blackcaps of the common or native varieties, such as grow along the lake shore, succeed better than the cultivated sorts. They are very productive and require no protection; fruit smaller than of tame varieties. Have had indifferent success with grapes.

We have a number of enterprising farmers in Murray county who are growing fruit successfully. Capt. Aldrich, one of the first settlers here, near Currie, on Lake Shetek, is one of our most extensive fruit growers. He has a large number of bearing apple trees, and has apples on the market every year, both of standard and hybrid varieties. Duchess and Wealthy are his favorite sorts. He has some twenty acres of natural timber for protection. He is also a very extensive grower of strawberries, raspberries, currants and grapes. He has a favorable location for grapes and is growing a number of varieties.

Mr. McIntyre a neighbor of Capt. Aldrich, is raising small fruits quite successfully; also apples of which he exhibited some fine specimens of Duchess and Wealthy at the fair the last two years. He has no protection from the north and his trees were not broken by the snow.

My neighbor, J. R. Cleveland, has very good success with strawberries and red raspberries, and markets several bushels of fruit each year. He had a similar experience with myself with apple trees; snow spoiled them last spring. If I were to set out an orchard again I would set it on the north side of a grove. Trees on the prairie need protection from winds in summer. Our heavy southwest winds shake off the fruit. There is no trouble raising Duchess, Transcendent and Hyslop here without any windbreak from the north, as they stand quite as hardy as the oak.

We experience no difficulty in growing small fruits where any attention is given them whatever. Every farmer should raise enough for his own use. They are no harder to grow than the common vegetables of the garden. Besides the pleasure and satisfaction afforded there is the gratification of having the choicest fruit, gathered fresh from your own grounds. More attention should be given to it,

especially to the growing of small fruits. It may not be profitable to spend too much time on apple trees, but everyone can have an abundance of choice home-grown small fruits of every kind.

Very little attention is given to native plums, as they grow wild and can be gathered by the hundreds of bushels along the shores of our lakes and running streams, and the fruit is very fine in its season.

Mr. Mellen, north of Curry, on the Tracy road, has a fine farm and a good orchard. His trees look healthy and bear well. He exhibits some fine apples at the fairs. He also raises fine crops of strawberries and raspberries; I do not know what varieties.

Alfred Terry, of Slayton, has a farm south of town, and is taking a great deal of interest in fruit and ornamental trees. He is growing standard and crab varieties of apples successfully. A number of others might be mentioned who are engaged in fruit growing in this county, and who find it both a pleasurable and lucrative occupation.

STATE EXPERIMENTAL STATION.

UNIVERSITY OF MINNESOTA EXPERIMENT STATION OF THE COLLEGE OF
AGRICULTURE.

Report of Prof. Edward D. Porter, Supt., St. Anthony Park.

Mr. President and Gentlemen :

I should present to you a much more detailed report of the operations of our experiment station, were it not for the fact that my work will be embraced in my own published reports, and it is not worth while perhaps to duplicate the report. You will find a portion of what I have to say in my first bulletin, which has been issued recently. I will refer to that briefly.

INTRODUCTORY.

As the work of this Agricultural Experiment Station is now organized on a new basis, to meet the requirements of recent legislation, it may be well to present a brief review of the work heretofore done in this department.

The act of Congress of July 2, 1862, donating public lands to the several states, for the benefit of agriculture, and the mechanic arts, authorized the expenditure of a sum, not exceeding ten per cent, of

the net proceeds of the sales of such lands, for the purchase of experimental farms.

In 1868, the legislature of Minnesota authorized the board of regents of the state university to expend \$8,500 from this fund for this purpose, and a tract of land near the university was bought, cleared, fenced, ditched, and put under cultivation, and under the direction of Prof. Charles Y. Lacy, was used as the Experimental Station, and School of Practice of the College of Agriculture up to 1880. Various lines of agricultural experimentation were undertaken by Prof. Lacy, and full detailed reports of the same were made annually to the board of regents, and will be found in their published reports for the years 1875-6-7-8-9, and '80.

Prof. Lacy withdrew from the institution in 1880, and in January, 1881, Prof. Edward D. Porter was placed in charge of the department of the Theory and Practice of Agriculture. After operating the farm for one season he was convinced that from the character of its soil, its proximity to the city, and continued subdivision by public thoroughfares, it was entirely unsuited for the purposes of an experiment station, and urged upon the board of regents the necessity of disposing of it and purchasing a more desirable location. The plans proposed were approved, and the legislature having given authority for the sale, and provided that all the proceeds of the same should be used in the purchase and equipment of the new farm, the old one was subdivided and sold from time to time up to the present, yielding sufficient funds to purchase and equip the new station. The location of this farm, its character and equipment, and the work accomplished up to Jan. 1, 1887, are fully set forth in the report of the department of agriculture, to the board of regents, and published as a supplement to their fourth biennial report to the governor.

The legislature of 1885 directed the board of regents of the University of Minnesota to establish, as soon as practicable, in connection with that institution, an Agricultural Experiment Station for the purpose of promoting agriculture in its various branches, placing it under the control and supervision of said board, making the professor of agriculture its general superintendent.

Unfortunately there were no funds placed at the disposal of the university to carry out the objects of the act, and there were none at the command of the department for that purpose, as all the funds derived from the sale of agricultural college lands were, by act of Congress, required to be devoted to the purposes of instruction. The experimental work given in previous reports, and accomplished up to the

present time, has been done with limited and unskilled assistance, and in such intervals of time as the director could secure from a mass of other duties.

The passage by the last Congress of what is known as the "Hatch Bill," making liberal appropriations for the work of agricultural experiment stations in all the states, and the prospect that the funds thus provided for will be available at an early day, will enable the board of regents to properly organize this station for the work contemplated. The increase of scientific and skilled assistants, a subdivision of labor, and release from a mass of details, will enable the director to give largely increased attention to the work of the station.

In carrying out the objects of the organization, we cordially invite the co-operation of the citizens of the State. Suggestions as to lines of experimental work, problems to be solved, inquiries relating to agriculture, horticulture, stock, and the dairy, will be cheerfully received and answered as far as possible; but no work will be undertaken unless of public value, and the results of which we are at liberty to use for the public good.

Specimens of grains and grasses; seeds of fruit and forest trees; vegetables, plants, and flowers that are true to name; varieties of beneficial and injurious insects; samples of mineral waters and ores, and whatever may illustrate any department of agriculture will be gladly received, and due acknowledgments made in annual reports. Directions for collecting, packing and shipping such specimens will be furnished on application, and all expenses paid.

Bulletins will be issued at least quarterly, giving the results of experimental work as fast as completed, together with such suggestions and information as may be thought valuable to the farmers of Minnesota. These bulletins and the annual reports will be sent, free of charge, to each newspaper in the State, and to such individuals as may request the same.

OUTLINE OF WORK.

There are several other matters to which I desire to call attention. As already intimated, the work of our experiment station is not confined exclusively to horticulture; it is designed to cover all the operations of agriculture, and we have of course to devote a due amount of attention to each; horticulture comes in for its proportion, and up to the present time it has received the lion's share of our work, for the reason that the facilities at hand enabled us to devote more attention to this line of work than to any other.

I have felt that this Horticultural Society is the best organization of farmers in the State, and that you were at my back to second my efforts, and I may add that I have been trying to do the best I could for the interests of horticulture in Minnesota. Our first work in this line has been, the tests of Russian apples. At the present time we have 302 varieties of these apples under cultivation. The most of these of course are from the experimental lists of Russians, and as to their behavior you will find a detailed report in our Bulletin, No. 1.

A word in regard to these Russian lists and for the benefit of persons unfamiliar with their nomenclature; the numbers, standing alone, are those of the government importation of 1868. When the letters "M" or Orel, or Vor, or Riga follow the numbers, they indicate later importations from Moscow, Orel, Voronesh, or Riga, in Russia.

We have selected for trial only such varieties as are thought best adapted to the soil and climate of Minnesota, and the experience of the last three winters will compel us to reject many of them. We have, however, found a few varieties that have proved to be perfectly hardy, passing through the severe tests of our climate without a bud injured, and if we can secure but a single one out of the three hundred on trial—hardy, of good quality and a long keeper—we shall feel amply repaid for our expenditure of time and labor, as this will constitute a foundation for future work.

REPORT ON CONDITION OF EXPERIMENTAL ORCHARD OF RUSSIAN APPLES.

The winter of 1886-7, like its predecessor, was one of unusual severity, differing from the previous winter in the greater snowfall, which covered the ground to a depth of from one to two feet from the middle of November well into the month of April. The snow drifted somewhat in the Russian orchard, but probably the severest time for the trees was the short season of thawing days and freezing nights which occurred in the latter part of March and the first two weeks of April. The melting snow formed sheets of ice by freezing solid at night, remaining thus, in some cases, two or three days at a time, and then thawing, only to be again frozen.

As was said of the Russian orchard in the report of this department for 1886, it had been planted in the spring of 1885 in the most exposed situation the farm afforded. It may be claimed that such a situation does not give the trees a fair chance, since any intelligent farmer would choose a protected location for an orchard; but the Russian

apples were heralded as being absolute ironclads, and if there was a possibility of their growing on the open prairies of Western Minnesota, then surely they should withstand the greatest exposure that could be given them in this timbered region.

The result of the winter of 1885-6 on the Russians, as heretofore reported, was the death of thirty-two and one-half per cent of the number planted. In the place of the thirty-seven trees thus winter killed, others were set, of varieties not before standing in the orchard.

The summer of 1886 was as favorable for tree growth as could be desired, and the trees were well matured when winter set in. Potatoes had been planted between the tree rows, and good cultivation had been given the entire orchard until about the middle of July, after which time the weeds were kept down by scalping, the ground not being disturbed save at the surface. In the forest tree nursery, cultivation was continued longer, and the plow was more frequently used, but the forest trees passed through the winter without injury, showing complete ripening of the wood.

The following notes, taken in August and in November, will show the condition of the Russian apple trees at those periods. The dead wood on the trees had been left purposely, as giving the best answer to questions regarding their hardiness. It will be noticed that a few duplicates are named, in which there is a difference in condition. The notes were taken while passing from tree to tree; in no case are there more than two trees of a kind in the orchard, and in many instances there is but one; where duplicates occur, the trees were not planted together, as was usual. The "killing" referred to was the result of the winter of 1886-7, and, unless otherwise noted, the measurements of dead wood refer to the growth of the summer of 1886, and the new growth to the season of 1887.

THE VARIETIES.

177. Green Streaked. Of the two trees of this variety, one killed back one inch, and in August was in fine condition, having made an excellent growth; leaves good and tree healthy. The other was barely alive. Growth of 1887, seventeen inches.

934. Both trees winter-killed badly, all the one-year-old wood being dead. Strong shoots had sprung from the roots of both trees. Growth of 1887, sixteen inches.

187. Glass Green. All last year's growth killed, but made a growth of twenty-six inches in 1887.

Possart's Nativ. Killed to snow line.

287. Riga Transparent Juicy. Dead.

287. Kremer's. Almost dead.

87M. Herren Apple. Weak.

Dobruï Krestiana. Killed back badly. Growth of 1887, twenty-six inches.

- Green Sugar. Almost dead.

262. Veronesh Reinette. Killed slightly; made but little growth last summer, but made a growth of eighteen inches in season of 1887.

375. Cinnamon Pine. Killed to old wood; strong growth last summer, and twenty-two inches in 1887.

105. Russian Gravenstein. Killed back six inches; healthy growth this season, making shoots twenty inches in length.

542 Yellow Calville. Planted last spring; weak. Made but four inches growth in 1887.

Sklanka. Planted last spring; growing first-rate; shoots of this season's growth twenty inches long.

457. Klineff's Apple. Killed back most of the new wood; trunk sun-scalded somewhat. This year's growth good, averaging twenty-two inches.

185. Anisette. Killed back three inches; fine growth the past season; good foliage, shoots of 1887 twenty-four inches long.

161. English Pippin, Longfield. One dead; other killed almost to old wood and badly sun-scalded; vigorous new growth, averaging twenty-two inches.

316. Red Queen. Killed back to old wood, but made a growth in 1887 of twenty-three inches.

365. Killed to old wood; strong shoots; growth of 1887, twenty-six inches.

38. Vor. Flat Veronesh. Killed but very little; in good condition; average growth of 1887, twenty inches.

502. Rambour Queen. Killed back badly; very strong shoots of 1887 growth, twenty inches in length.

Antonovka. Killed all new growth and part of two-year old wood in two trees; strong growth from trunk, averaging twenty-eight inches.

252. Aport. Killed back to old wood, but made a growth of twenty-seven inches in 1887.

262. Charlamoff. Killed back to old wood.

361. Pointed Pipka. One tree killed eight inches; new growth ex-

cellent, averaging twenty-one inches. One killed but little, being the best in the orchard; no scald; fine growth; healthy foliage.

984. Kursk Anis. Killed but slightly; leaves small and good; tree healthy, having made a growth of twenty-eight inches in 1887.

230. Titus. In fine condition. Killed but very little. Shoots twenty inches long in 1887.

599. Romna. Two trees killed back badly, but sent out strong shoots the past summer, averaging eighteen inches.

Borovinka. Lateral branches nearly all dead, but strong new growth of twenty-six inches.

Gruchevka. Two trees have stood the two winters better than any others in the orchard. Killed back one inch. Good growth the past season; leaf not so thick as in many more tender sorts. Growth of sixteen inches in season of 1887.

477. Christ Birth. One dead; one killed to snow line, but made a growth of thirty-one inches in 1887.

413. Cross. Killed to snow line. Made a growth of twenty inches in 1887.

269. Rosy Aport. Killed back six inches; good growth the past summer, averaging twenty-three inches.

Yellow Transparent. Killed to snow line, twenty-seven inches growth in 1887.

268. Saccharine. Killed to old wood; strong new growth of twenty-six inches.

202. Hare Pipka. Killed almost to old wood; fine new growth of twenty-six inches.

200. Red Pipka. Killed one inch; good healthy growth the past summer; two trees averaging seventeen inches growth in 1887.

52. Vor. Killed eight inches; poor growth the past season, only three inches.

582. Leaders killed eight inches; laterals almost to old wood; strong new growth of twenty-eight inches.

365. Killed back six inches; strong growth in the tops, averaging twenty-four inches.

Aport Orient. Killed one inch; is doing well; made a growth of twenty-four inches the present season.

284. Kremer's Glass. Killed back almost to two year wood, but made a growth of twenty-four inches.

290. Ukraine, killed back eight inches; fine healthy growth the past season of sixteen inches.

Plodovitka. One dead; other killed one-half; growth all water sprouts.

Rubet's Nativ. Killed four inches; good new growth of twenty-one inches.

Kiev Reinette. All the one-year-old wood dead on one tree. The other killed back one to four inches and in good condition.

277. Lead. Killed back into old wood; growth of 1887, fourteen inches.

206. Czar's Thorn. Killed eight to ten inches; sun-scalded but made a growth of thirty inches in 1887.

210. Vinograd. Killed back four inches; good growth this season.

469. Grandmother. Killed to old wood; very strong new growth of thirty-six inches this season.

4M. Ostroff's Glass. Killed back six inches; top very weak; strong shoots from below of twenty-eight inches.

461. Ribbed. Dead to snow line.

407. Blackwood. Very weak in the top; strong water sprouts of thirty inches.

396. Killed one-half.

Arkad. In one all the new wood killed; the other killed back but one inch, and has made a good new growth of fourteen inches.

282. Veronesh Reinette. Killed back two inches; fairly good new growth of fifteen inches.

984. Kursk Anis. Killed back two inches; new growth of twenty inches; trunk clean and bark good.

21. Vor. Yellow Calville. Killed back one to two inches; growth in top good; trunk of one tree in bad shape, but made an average growth of twenty-eight inches.

164. Heidorn. Killed one inch; fairly good new growth.

56. Vor. Gipsy Girl. Killed back one-half inch; trunk in bad shape; leaves all eaten off by caterpillars; moderate growth in top, good shoots near the ground of fifteen inches growth.

Early Sweet Veronesh. One nearly dead; other killed back four inches and in weak condition; growth for the season of 1887, eighteen inches.

22M. Blushed Calville. Killed back one inch; slow grower, but evidently in perfect health; made shoots of nineteen inches in length during 1887.

20M. Kursk Reinette. Killed one to four inches; growth healthy, and twelve inches in length.

378. Hibernial. Killed very little; good growth.

Arabskoe. One year-old-tree, set in spring of 1886, killed back eight inches, and made growth of twenty inches in 1887.

214. Garden. Tree same as last; killed back four inches; good growth the past season.

44M. Sandy Glass. Weak during summer, but made a growth of twenty-eight inches during the season.

304. Switzer. Killed back six inches; good growth of twenty-five inches.

4M. Ostrokoff's Glass. Killed back one inch; good healthy growth of twenty-six inches.

Duchess. Of fifty-two Duchess trees planted in the spring of 1885, at the same time and in the same orchard with the foregoing lists of Russians, half are dead and of the remainder the new growth killed back almost as bad as did Antonovka. The average growth of these trees in 1887 was sixteen inches. In another orchard, which stands on a northeast slope and is well protected on the south and west by an oak grove, the Duchess killed back but little.

REMARKS.

Of the sixty-five varieties noted, not one started growth from terminal buds in the spring of 1887. Those which killed back one inch or less, and which, in such situations as are ordinarily chosen for orchards, may fairly be presumed to be perfectly hardy in this latitude are Green Streaked, Veronesh Reinette, Flat Voronish, Kursk Anis, Pointed Pipka, Titus, Gruchevka, Red Pipka, Aport Orient, Arkad, Yellow Calville, Heidhorn, Gipsy Girl (56 Vor.), Blushed Calville, Hibernial and Ostrokoff's Glass.

It is not fair to assert, however, that the remainder of the list is too tender for culture in Minnesota; nor, on the other hand, can entire hardiness be claimed for the above list.

The foregoing notes merely tell the action of the varieties named under certain conditions, and so far as location is concerned, it should be borne in mind that these conditions were decidedly the most severe that could be chosen.

A comparison of the foregoing list with the Duchess will prove interesting. While the average of the Duchess trees did not stand the winter much, if any, better than Antonovka, which killed back to old wood, there were a few trees that produced good growth from buds near the base of the one-year-old branches, and averaging twenty-two inches in length. The Duchess seems to have in an unusual degree the power of recovery from winter injury, and it may be that many other Russians will develop the same quality. The Duchess has long

been known to winter-kill in this latitude, but all apple growers regard it as a safe investment, and they take it as a standard of hardiness.

The experimental orchard in its two year's history has shown sixteen varieties of apples to be hardier than Duchess, when grown under exactly similar conditions and side by side. There yet remains in the Russian nursery over one hundred and fifty varieties to be subjected to the same test that these have stood. When an effort is made to name sixteen varieties of native apples which would show equal hardiness under the same conditions, the comparison must result favorably to the Russians.

The experience of the past two trying winters has compelled us to reject many varieties. But we have some that are hardier than the Burr oak, because if you examine the terminal buds of the oak you will find them killed back two or three inches, while I have Russians so hardy that the terminal buds are not injured. Hence it is patent that when we have a tree of that character we have a foundation to build upon and something of real value.

In addition to the foregoing list of Russian apples we have devoted much time and attention to the culture and comparison of all the leading varieties of fruit grown in Minnesota, embracing native and foreign plums, Russian bean, forty-two varieties of grapes, all the promising varieties of strawberries, currants, gooseberries, blackberries and raspberries, as well as a full line of trees, shrubs and plants for forestry and ornamental planting; these are in their third season of growth and their value will be reported upon at your next meeting.

In the line of market gardening we have had growing the past year almost every variety of vegetable known to our catalogues, and their condition and value attested by the hundreds of visitors who have manifested an interest in our work by making a personal inspection.

Before closing this report I wish to call the attention of this Society to the importance of the collection, improvement and dissemination of the best varieties of our native trees, shrubs and plants. In many of them I see large promise for the future of horticulture in Minnesota. Our native varieties of plums, grapes, wild fruits and flowers, from their value, beauty and hardiness, furnish a splendid foundation for new and improved varieties. Many of them have a local reputation and their merits are reported from time to time at our meetings, but for want of systematic attention they are lost sight of, and their dissemination postponed for a generation. The collection and testing of these native productions should be the duty of our experimental station; and this brings me to the subject of

CO-OPERATIVE EXPERIMENT STATIONS,

a plan for which I wish to outline to you, and if it meets your approval, to give it your endorsement and support.

I would propose the selection of one or more persons in each county in the State who are well qualified to undertake the work in their special lines of agriculture and horticulture, who should be invited to become correspondents and observers for the central experiment station. To these assistants the station would furnish free of cost collections of seeds, plants and cuttings, for trial and dissemination in their several localities, instruments for making observations of temperature and rainfall, blanks and instructions for their reports, and such other assistance as might be required, only asking in return that they would render a report of their work and send back to the station any new varieties of trees, plants or shrubs, which they might find in their sections of the State for further examination and distribution. Those reports would be collected and arranged by the scientific force at the central station and published for the benefit of the whole State. Such in brief is the plan I would propose for the organization of this experimental work. Does it meet your approval?

President Elliot. We will take up this subject this afternoon. Different ideas are entertained in regard to this work. Let us take time to consider this matter and give it such endorsement as we think it best to give.

The meeting then adjourned till 1 o'clock P. M.

AFTERNOON SESSION.

FRIDAY, JAN. 20, 1888.

The meeting was called to order at 1 o'clock P. M. by President Elliot.

Mr. Smith moved as the sense of this Society that the plan of co-operative experimentation, as outlined by Prof. Porter, be heartily approved, and that we pledge him our active assistance and support.

Mr. Cutler. Mr. President, I think it would be well enough for the Society to understand this question before voting upon it. There are some matters in reference to it that I don't fully understand. If this money is to be expended it seems to me it ought to be used so that every part of the State will receive the benefit, and if there is to be a division of the work why should not the fund be divided? I understand

there is \$15,000 appropriated by Congress to make these experiments and to establish experiment stations. I do not think that one central station should get the whole of that appropriation.

Col. Stevens. It seems to me the terms that Prof. Porter mentioned are most liberal, as he will furnish the tools, seeds, shrubbery and nursery stock and everything of the kind, and the man who attends to those things that he furnishes, gets the benefit. If he has fruit trees or anything else that he raises, he sets them in his own yard and orchard, or gives them to his neighbors. I think there are plenty of men to be found who would be glad to render the assistance and receive the benefits.

Mr. Smith. I don't think there will be any difficulty in obtaining plenty of good men in every county for this work.

Col. Stevens. No; I don't think we should be too selfish in this matter. I think the terms offered are very liberal. McLeod county was my old home and I think Mr. Cutler will be very willing to take hold as one of the enterprising horticulturists in that county and help to build up this great enterprise.

Mr. Young. Mr. President, I don't think it is necessary to discuss this question at all. The Society is not expected to force anybody to make experiments. It is proposed that its members volunteer, or that the Society recommend the adoption of this system, and it is expected that farmers and others will come forward to help themselves this much, and if they will not they alone will be the losers. But I am very confident, that there are men out on the Western prairies that are spending their money trying to make a success of their farming operations there, who would be only too glad to take hold of this work. I get letters every day or two asking information, from these men, and I think Prof. Porter will be backed by the most intelligent part of the community, in the western part of the State.

Mr. Underwood. The gentleman says it is not worth while to discuss it. I don't understand it is a question for discussion, but it is simply whether he can secure a strong expression in support of this undertaking. Now, as an individual member, I think I should feel proud to assist Prof. Porter as a member of the Horticultural Society, and to hold up his work in every possible way. That is what this question is brought up here for. And as far as men volunteering to give their time to this work, if it is proposed to do that, I think there are plenty of farmers in the State who would be glad to give their time and take the benefits of the knowledge they will gain thereby and the assistance they will receive from the central station.

Mr. Young. I did not mean to say that it was not worth while to discuss the project, but we might discuss whether volunteers could be obtained or not.

Mr. Gibbs. If I understand this question,—I was not here this morning to hear Prof. Porter's report, but if I understand it,—a person is not required to procure stock for distribution or furnish trees for other parties, but his stock is furnished ready to his hands and all he is expected to do is to plant it in a favorable situation and to take care of it, and to make a report from time to time to the central station.

Prof. Porter. That is the idea, only it is designed to be upon a definite plan to secure uniformity of work and reports. For instance, we make experiments with Russian wheat. We take forty or fifty bushels of wheat grown or procured by the central station, and distribute it in sufficient quantities for the farmers to test. All I want to know is the manner in which the experiment is conducted, the locality, character of soil, and to get reports that are uniform, and to send out these reports in our bulletins, for the benefit of every farmer in the State.

Mr. Gibbs. I had in my mind the experiments to be conducted in the line of horticulture; is it the intention to combine these with other experiments?

Prof. Porter. We expect to secure specialists in every line of agriculture and horticulture, men who will take an interest in the work entrusted to them, and well qualified for its execution. From such men we always get the best results.

President Elliot. The question came up in regard to how these experimenters were to be reimbursed for their trouble. I think perhaps when Mr. Cutler comes to look at it and to see just the bearing it would have, if we were to go to work and distribute this \$15,000 all over our State, he would see that it would be so thin that we should lose all the results. But if we can have one central station to guide and conduct this work, and have volunteer workers outside, as Prof. Porter has outlined, then we would get at something that would be definite. If we attempt to spread out it seems that we could not accomplish so much.

Mr. Gibbs. I know Mr. Cutler, here, and there is not a man in this Society, I think, that will do more than he in aiding in this work, and the object of my speaking was to relieve his mind as to the effect this would be likely to have upon the general public, in sending out these different things for experimentation. It is not expected that

Prof. Porter will send out things that are not likely to succeed. Those will be confined to his own station, and he will only send out the best. He is, therefore, really conferring a favor upon anyone, whether an orchardist or gardener, in putting only reliable stock in his hands. I only wish he had the territory of Dakota under his jurisdiction, and that some of us out there might share in these advantages with the farmers and gardeners of Minnesota.

Mr. Sias. Our chairman says that we want to separate this \$15,000, and if it was spread out over the whole State for the support of these different stations it would be pretty thin. That reminds me of a remark that Fred Douglas made at the time that Franklin Pierce, of New Hampshire, was running for President of the United States. He said that "Mr. Pierce was a good third-rate lawyer of New Hampshire, but you come to spread him out all over this Union he will be so thin he won't amount to anything." Mr. Douglas was simply mistaken for he did amount to something. He became soon after a President of the United States.

I have been experimenting at Rochester for the past twenty-five years and I have not received a dollar to meet the expenses; have been working hard and living cheap, experimenting in trying to find that "winter apple." I think a number here have been trying, and directing their attention in the same direction. I am satisfied from my experience during these twenty-five years that we should still continue and follow the direction given by Dr. Von Mons and of Andrew Knight. And I think that the plan of Mr. Knight, of cross-fertilization, is probably the shortest route, and I intend to follow that with some varieties that are much hardier than Duchess, and I think by careful crossing we may hope to find a late keeper and in this way be likely to get a winter apple. If it can be done by any of these superintendents I am satisfied; but I believe Prof. Porter can use this fund to good advantage, and I believe he will do it in the way of experimenting. I believe his plan is a good one.

Mr. Pearce said he had drawn up a resolution similar to the one under consideration, which had reference simply to horticulture. He had experimented at Minnetonka a number of years and become fully satisfied that fruit could be grown in large quantities all over the State. During the past winter he had written to many persons and proposed to furnish them stock on a small scale to start with. Prof. Porter proposed to divide this work among specialists. One man should make a specialty of fruit and nothing else. He would suggest the sending out of nothing but known and tried varieties to experi-

ment upon; every farmer should put them out, and by following a particular system the same results would be secured in every instance, and then not one in fifty would make a failure. He thought this plan would do more in five years than had been accomplished heretofore in twenty in the way such work had been conducted, because it would reach every man in the State. Every man would know what his neighbor has, and know the quality of what he received and its duplicate could be obtained at the station. He had known such instances and considered it the best system that could possibly be followed; there was nothing equaling it. He was heartily in favor of the measure.

President Elliot. This subject has now been fully discussed, and if I understand it, the question is upon the endorsement of the plan outlined by Prof. Porter. What is your pleasure in the matter?

The plan for the co-operative experimentation was unanimously approved.

Mr. Cutler offered a resolution favoring the passage by Congress of the bill for the reduction of postage on seeds and books, which was adopted.

CORRESPONDENCE.

The following letter was received from Mr. Keffer of the Dakota Agricultural College.

FROM DAKOTA.

BROOKINGS, DAK., Jan. 17, 1888.

S. D. Hillman, Secretary, etc.:

I regret that business prevents my being with you at the meeting of the Horticultural Society, which convenes to-day. I should have written this letter last week, but, as you are probably aware, we are blockaded. I write now more in hope that the blockade will be "raised" to-morrow than in faith of such good fortune.

I congratulate your Society on the good work it has accomplished during its legal infancy, and now that it has arrived at man's estate, we on the outside—especially we of Dakota—will expect still greater things.

The meeting at Huron was but slimly attended, but great interest was manifested, and I feel sure we have the nucleus on which to build a strong society. We were very glad to see your delegate, Mr. Sias;

he proved a veritable missionary, and the gospel he brought was good sound horticultural gospel. Do you know the addresses of parties who have planted Russian apples? I would be under obligations to you if you would send me a list.

Hoping you may have an especially profitable and pleasant session, I remain.

Yours very truly,

CHAS. A. KEFFER.

FROM RUSSIA.

MOLIE-LEV-UPON-THE-DNIEPER, RUSSIA, FEB. 19, 1887.

S. D. Hillman, Secretary, etc.

I duly received your favor of Dec. 27, 1886, and must apologize for not replying to it sooner.

I have not had opportunity to write the promised paper, having been engaged all the time in this northern region.

I have received to-day a letter from Mr. Ragan informing me that he has received the scions, and will send you the package destined for your Society. Hope that the scions will arrive in good state and be of use to the Society.

I intend to send you, next fall, scions from trees grown here in Petrosavosk under the 62° north latitude.

I wrote you that I have not seen nor eaten of the fruits of the varieties that were praised to me; one that I had the disadvantage to taste was bitterly sour. It is also not fair to claim of a tree grown in such latitude to give first-rate fruit.

But taking in consideration that they endure here often 29° ream of frost, and all the winters are blowing blizzards, such tree must be a truly hardy one, and can be undoubtedly of use as material to your intelligent orchardists to train for your State for an ironclad variety of apple.

Leaving this country, I have asked friends to send me, next fall, seeds and scions from apples of this place, and shall send you some for trial.

Your amiable offer to send me the last report of Iowa will be duly appreciated, if you shall have the kindness to mail me a copy.

I take also the liberty to ask you to have the kindness to send me seeds of Western Catalpa (*Catalpa speciosa*) and box elder (*Acer Negunda*) as samples, and to give me prices for one kilogram. In the

report of the commissioner of agriculture I have read that these trees are easily propagated, rapid in growth and give valuable timber.

I have the intention to recommend them to be tried by our southwestern railroads to protect their tracks from snow drifts.

Have the amiability, also, to name me a reliable seedsman from whom it would be possible to have these seeds in greater quantities.

I remain, with great respect,

Yours truly,

G. DOPPELMAIR.

Aug. 6, 1887.

S. D. Hillman, Sec'y, etc.

Returned from a long absence to Molie lev. I have had the pleasure to receive your kind letter and the regards of your Society. Please accept my warmest thanks for the same.

From Kiev I have sent you the promised report of our department of agriculture, about fruit growing in Russia. It was sent by my bookseller to a false address and returned to Petrosavosk. Hope that you shall receive it this time.

The summer here was very cold and rainy; hail and storms were very frequent. The leaves and apples have suffered severely.

Very respectfully yours,

G. DOPPELMAIR.

FROM SECRETARY GARFIELD.

GRAND RAPIDS, MICH., Sept. 27, 1887.

S. D. Hillman, Secretary, etc.:

Your pleasant note sent me at Boston has been forwarded here. It would please me greatly to visit your State, and I hope to do so some time. * * * *

I feel that the American Pomological Society is more truly national to-day than ever, and by careful methods and earnest labor, it can be made to serve American Pomology better than ever before. I shall always gladly receive a letter from you.

Sincerely yours,

GARFIELD.

FROM ONTARIO.

GRANTON P. O. ONT., April 26, 1887.

S. D. Hillman, Secretary, etc.:

I must apologize for being so tardy in sending my fees for membership in your Society. I belong to a number, and from no other report do I get so much valuable information. Enclosed please find the amount of membership fee.

Dear Friend, will I ever have the privilege of meeting you again on this earth? if not, may our Lord Jesus guide, keep and save us, so we shall meet again in his eternal world of blessedness and rest.

Yours truly,

JOHN LITTLE.

FROM NEBRASKA.

TABLE ROCK, NEB., June 15, 1887.

S. D. Hillman, Secretary, etc..

Permit me to acknowledge the receipt of one dozen copies of your State Horticultural Report for 1887, and to thank you for the same. Will reciprocate as soon as our new volume is out, which will not be completed until late in July or first of August.

Crop prospects are good; fruit not to exceed one-half crop except blackberries, which promise a large crop.

Yours fraternally,

S. B. BARNARD,
Sec. Nebraska Hort. Society.

Following is the paper contributed by Hon. D. B. Wier on Native Plums:

NATIVE PLUMS AND HOW TO FRUIT THEM.

By D. B. Wier, Lacon, Ill.

The Native plums are the indigenous, or wild plums, of this continent and their direct descendants from seed. These plums all belong to the genus *Prunus* of the sub-order *Amygdalea*, (the Almond family) of the order *Rosacea*, to which nearly all our cultivated fruits belong. To the genus *Prunus* belong nearly all the stone fruits in cul-

tivation, and it has representatives with edible and useful fruits, in the wild state in nearly every portion of our country, and perhaps of the continent.

SPECIES.

The plums proper range from south Florida to the Arctic circle, and are divided by botanists into four or more species, namely: *Prunus Americana*, found in nearly every portion of the country; *Prunus Chicasa*, generally confined to the Mississippi valley; *Prunus Maratima*, peculiar to the sea coast south and east; and *Prunus Umbelata*, generally confined to the extreme south. The student who investigates these so-called species over their entire habitat will soon find that they cannot be divided into true and distinct species; and if he gives them attention he will eventually find that they are, possibly with one exception, all one species, or can be all graded the one into the other. That they all freely cross by fertilizing each others' flowers, and that they are simply well marked climatic and geographic races ranging in size of mature plants from six inches to twenty-five feet in height. Europe and Asia have given us of the Almond family the cultivated and wild plums of those continents; also the peach, almond, apricot, and cherry. These are all quite near to our wild plums, for they all freely interbud and graft on them. And we know that some of the most distinct species cross sexually and produce hybrids with them.

For the present we will follow the classification of the native plums, as given in our text books of Botany; but I will here warn the student that it will be impossible for him to refer many of these varieties to any of the species therein given, and that if he studies them comprehensively he will find many groups and races showing as good or better distinct species than those given in the text books.

A word of explanation will help us greatly to a full understanding of this point. We will say that the student visits the Mississippi valley, between the lower Arkansas and Red river, there to study the Chickasaw species of plums. He will there find it a small tree, ten to twenty-five feet in height, with fruit of all sizes from that of a cherry to a hen's egg, with every color from yellowish white to yellow, pink or scarlet to darkest crimson, and ripening from early in May to September.

Then if he should search in the ravines of the higher plains of Colorado, he will find a little dwarf shrub six inches to a foot in height, perhaps loaded with edible fruit as large and good as the average of that in the valley, but more nearly constant in size, color

and time of ripening. At these two points we have found seemingly two very different things or species of plums. But, if the student starts from the Chickasaw Bluffs, opposite the mouth of the Arkansas river, and follows the so-called *Prunus Chicasa* up the valley of the Arkansas river, he will find the tree of that species continually decreasing in size. Where this river enters Kansas, his plum tree is a shrub three to five feet high; where it leaves Kansas, one to two feet, and then in the centre of the great Colorado plain, the little dwarf thing before spoken of six to twelve inches in height, when he will have before him what Botanists have called *Prunus Pumila*, or the Sand plum of the plains. Yet the two are one and the same species, and the Sand plum is the remote ancestor of the Chickasaw plum. The seeds of the Sand plum were carried down by the two great rivers, the Red and Arkansas, into the valley with its rich soil, longer summers, warmer climate and humid air, and after many generations the result is as we now find it. In the same way can we trace the *Prunus Americana* up the Missouri river, until it runs it into the dwarf Sand Cherry of the North; and by a study of these two dwarf forms, between Montana and New Mexico, he might be able to find and raise a dozen distinct forms up to the grade of species. So we also find all the so-called species differing widely in their different habitats, and all gradually and perfectly grading the one into the other at places where they intermingle; but nevertheless, we will find true types of all the species where they are all growing together.

With the two most prominent species the only marked specific difference seems to be that *Prunus Chicasa* is not found indigenous north of Illinois. But the other, *Prunus Americana*, seems to cover nearly the whole continent. These two species seem to reach their highest excellence in fruits, as found wild, the last named in Wisconsin and Northern Iowa, and the former in Tennessee and adjoining states. With these two species this paper has to do. Of the other species we have as yet no varieties worthy of cultivation, though *Prunus umbelata* is said to give delicious fruit in southwestern Texas. Basset's American is an example of *Prunus Maratima*, for which we have no use. This much is necessary for somewhat of an understanding of our subject. We will now take up the practical part.

PLUMS FOR PROFIT.

We gather from the foregoing that our wild plums, in some of their species and varieties, are fruits natives of and adapted to cultivation in every part of this country and beyond, both north and south. Are

they worthy of culture? It is safe to say that the majority of persons who have planted these plums for fruit, would answer this question emphatically in the negative, that they are not; they being forced to give this answer from the result of many trials, all resulting in, perhaps, complete failures, for reasons that would be presently explained. But a few of us who have learned their needs, and have planted them rightly, either by design or accident, have found them to be very profitable, and to bear enormous crops of marketable and useful fruits nearly every year, with but very little care.

PROPAGATION.

How should they be planted to insure regular crops of fruits? In rows running north and south, with the trees four to eight feet in the row, several varieties (or even species) alternating; the more varieties the better. This is as near as we can come at it with our present knowledge. The rows should be twelve to twenty feet apart.

Why is it necessary to so plant them? Because it has been determined that very few of these plums can fertilize or pollenate their own flowers, and that they must receive pollen from some other variety or species of the Almond family, or the ovaries of the fruit will not be fertilized, but will all fall from the trees when quite small. A few of them are fertilized with their own pollen, but I have found none but what is more productive when near another variety with acceptable, potent pollen. Farther, we know that all varieties are not mutually fertile when near each other. Therefore, with our present knowledge we can only say as above, plant many varieties near together. If you were farther south we could give you a safe, simple rule, meeting all cases so far as tried, namely: Plant these plums six feet apart in the row, with every third tree of the variety known as Miner, for it seems to have pollen fertile with all and all others with it, and it is a good market plum. It is a cross between *P. Americana* and *P. Chicasa*, but as it is not hardy with you, you will have to plant by the general rule given and experiment for yourselves.

None of the Chickasaw plums are fully fertile on my place with their own pollen, or with that of other varieties of the species; therefore seeds produced on these, when fertilized by pollen of Miner or any variety of *P. Americana*, are hybrids or crosses, and from such seed I have, and you may all expect our best new plums.

The Wild Goose plum, in its peculiar characteristics, shows good proofs of being a hybrid between the Chickasaw and the peach; and

so far I have found no pollen that will render it fully fruitful except that of the Miner. It is partially fruitful with nearly all members of the Almond family. Many trees of it, old enough to bear fruit for the past ten to twenty years, entirely isolated from other members of the Almond family, have never produced fruit.

FERTILIZATION.

That we will eventually gain new and valuable hybrids, between nearly all the species of the Almond family I have no doubt. In fact, we have many such now, these peculiarities of the Wild Goose and other varieties are given here to prevent mistakes, for we might cast aside a most valuable thing that seemed entirely barren, but which if given a consort with acceptable pollen might be of the greatest value, and an important point which we must bear in mind when sending out any new plums we may gain from seed, or find in the woods, is this. I know that these plums (and many other fruits also) are sometimes changed radically, often in all their characteristics, by the pollen their flowers are fertilized with. That is to say: a plum that is not fertile with its own pollen, may give very choice fruit with the pollen of one variety and very poor with that of another. So plainly has this been shown on my place that I now fear to send out any of my new plums, until I have fruited them in a different environment.

And this fact explains why so many native plums that have been sent out, went up like a rocket in glory for a time, but eventually came down like a stick. They either have no fruit or very poor fruit when their location was changed. It is probable that a smile of incredulity may be spreading over the faces of this audience at this remark, but my friends I am giving you *facts* not fiction. Pollen has a powerful influence over the fruit and all its appurtenances at times, and I am confident that it has over the whole vitality of the tree or plant in some cases. You are not astonished at your corn mixing in the grain, when one very distinct variety is fertilized by the pollen of an other, nor with the members of the gourd family (*Cucurbitacea*) especially the watermelons. It is even claimed, and correctly I think, that two varieties of potatoes will have their tubers changed by pollen when grown side by side; such instances are, of course, the exception instead of the rule. Many other plants show such effects of pollen.

I have often seen and carefully studied complete changes in apples from this cause. In fact pollenization, hybridism, and the crossing of

varieties and species are *the great* studies of the future now barely commenced.

MARKETING.

Are these plums profitable as a market fruit? Growing fruit for market has been my principal business in North Central Illinois for forty-five years, all the fruits that could be grown in that region, and I have found no fruit that will nearly approach these plums in net cash returns, for the amount of ground occupied and care given.

They sell everywhere readily. Our little town of 2,000 people absorbs 300 bushels a year at from \$2 to \$4 per bushel. Other large producers give the same report. One firm in northern Indiana reports sales of 2000 one-half bushel cases of Wild Goose plums, the past season at from \$1 to \$1.75 per case. When we consider the fact that these plums range in quality from those utterly worthless for any purpose, to large, luscious, most beautiful fruits, two or more inches in diameter, and ripening from June 20th until October, it is, of course found that value is dependent on variety. Nor is it true that the variety most profitable for market, is the one of the most value for home use. Miner and Wild Goose are the largest and handsomest of the older varieties that are passably good. They have a market value because they have been cultivated for many years and have become known, yet as fruits for home use, compared with others, they are very poor. The two best native plums for all home uses, that I have seen, are so inferior in looks that they would hardly be sold at any price in the open city market. Yet these two plums are so fine as to compare favorably with the best California apricots when canned and both placed on the same table, on a test of quality by fruit growers. They are both pure northern plums, free-stone, with very thin skins, and no bitterness; I shall not name them for there are no trees of them now to be had. I only give these facts to show what we may expect from these plums in the future. For one, I am convinced that they will prove our most valuable fruit for the Northwest, and of great value throughout the country.

VARIETIES.

What varieties should we plant? To this question I can give you Minnesota planters but very little advice of value. You must experiment yet for many years. All I can now say is, for you to plant of all the Northwestern varieties that you may deem worthy of trial, by hearsay or otherwise, such as DeSoto, Weaver, Wolf, Spear, Rollingstone, Pottawattamie, Forest Garden, Hawkeye, etc., etc. Hunt for good ones in the woods, plant seeds, get trees from Manitoba; a friend

says he found fine ones there in the woods. Top-graft the Chickasaws on the branches of the free-growing, hardy Northern plums. Get the "sand plums" and "sand cherries" from the West, and plant all near together, all mixed up. The Newman and perhaps Mariana seem to be the hardiest of the Chickasaws; they and possibly the Robinson, and I think the Miner, should be grafted in the branches of Rollingstone and Weaver.

THE CURCULIS.

Do not fear the plum curculio (*Conotrachelus neumphar*), for this insect has no practical effect on the fruit crop of these plums whatever. The twenty years of my experience with them shows this conclusively, and I will give it to you in a few words. This insect seems to prefer these plums as a food plant, and to lay her eggs in its fruits above all other plants, for the very good reason that they have through all time been her natural food plant. By most careful study I have found the facts as follows: (1) The plum curculio seeks the native plums the first warm days of spring for food, and reaches them generally before they bloom. (2) The curculio can at that time be very generally destroyed by spraying the trees just before the blossoms open and a week later they have fallen with the arsenical poisons, Paris green and London purple, as the insect is at that time feeding freely on the young growth of the tree. I give this plan, not to protect the plums, but as a means of a general destruction of this most injurious insect to other fruits. I have found no necessity for protecting any of these plums from the curculio. (3) If the curculio is even so plenty as to lay from one to twenty eggs in every plum, my experience has been that if the plums have been fully fertilized the trees will mature a full crop of marketable and useful fruit. (4) For but very few of her eggs laid in these plums hatch, and still fewer of her young, or larvæ, reach maturity. My estimates here, during four years of careful observation, proves that it takes more than 3,000 eggs laid in any of the over 3,000 varieties of native plums in fruit on my place, to produce one well matured curculio grub, except in the variety known as Wild Goose; and even in it not near enough mature to keep up the species, not more than one grub to each six hundred eggs laid. Therefore, as each curculio averages only one hundred eggs, then even if confined to this plum for breeding purposes the insect would eventually disappear. All of this is fully proven by experience with me. For, since my first great crop five years ago, nearly every plum which showed from one to twenty ovipositing

marks of the curculio, each succeeding crop has shown a marked decrease in the numbers of the insect, the last crop being practically free from her ovipositing marks, and showing by careful estimate a decrease in the five years of ninety-eight per cent, and this without anything whatever being done to destroy the insect or to protect the fruit from her. (5) These facts prove, I think, that a large amount of these plums in fruit will free a neighborhood of this most pernicious insect; that the fruiting of these plums alone in quantity will do it, and in that way deliver all our other fruits from its ravages. And, besides, we have absolute experimental proof that spraying the plum trees, as before mentioned, will protect the other fruits near by.

Propagation.—For the North, all the native plums should be on their own roots, or those of other fully hardy plums of the North. The "sand plums" and "sand cherries" of the West may prove useful. Your cherries should be top-grafted on these hardy plums.

Soil and Experience.—These plums are partial to a deep, rich, moist soil; near the base of a hill is a choice place for them, though they do finely on any reasonably good soil; but, if possible, should have a location somewhat sheltered from the strong winds of spring. This bush, in all its hardy varieties, you will find a most excellent windbreak for shelter. Many are planting them for that purpose. They fruit finely when growing very thickly.

P. S. Since writing the above, I have received a letter from Dr. C. V. Riley, Chief of the U. S. Entomological Division of the Department of Agriculture, Washington, D C., in which he makes certain admissions and explanations, that settles for the time all questions in dispute, and I forward him my answer to his criticism on my paper. In the position that Dr. Riley sustains before the whole American people, he is obliged to be very communicative on new questions of fact, and knowing him intimately for twenty-five years, and having not the least doubt of my facts, I have no hesitation in placing the whole matter in his able hands for future adjustment. For the grower of stone-fruits a new era has dawned.



The next on the program was a paper by Mr. Barrett.

BENEFITS OF FORESTS.

By J. O. Barrett, Browns Valley.

As a guide to right conclusions, let us for a moment consider Nature's law of equilibrium between the animal and vegetable creations. The animal breathes out carbonic acid, mixture of oxygen and carbon; under the intervention of solar rays, separating and purifying the compound, the animal appropriates the oxygen and the plant appropriates the carbonaceous portion. Thus the two great divisions of nature reciprocally support each other. Obviously, then, that country is safest to live in and promises the surest profits for industry, where, other things being equal, the animal and vegetable creations mutually balance each other. It is no doubt true that our atmosphere holds its gasses in certain specific proportions over the entire surface of the earth, but it is also true that soils, forests, water and the configurations of a country effect the chemical condition of the atmosphere, that some localities may generate more of one kind of acid than another. For instance, where there is a large quantity of decaying vegetable matter, or gaseous fissures at or in bog lands, the immediate atmosphere will be unduly charged with carbonaceous gasses. Another fact is patent, that even in localities where the acids are in chemical balance, volume with volume, or weight with weight, they cannot be appropriated for the objects desired unless their quality is adaptable. Let me make this plain:

CHEMICALLY CONSIDERED.

Here is an acre of ground amply manured. It exhales at least one hundred and fifty cubic feet of carbonic acid every twenty-four hours. Are we yet sure chemical conditions are all right for a successful crop? If the raw material of the soil, such as lime, selicia, iron, magnesia, soda, is crude and non-vitalized; if the manure is "fire fanged," neutralizing its ammonial properties; if the genuine excrement is heavily mixed with wild, dry grasses, retarding decay, the crop will be a comparative failure. The nitrogen in such a manure pile, or in the fertilizer you buy for a soil dressing, may not be any better than a stone to feed a crop. Success hinges upon *quality* in the *quantity*. The primary elements of the original rocks, composing the constituents of the soil, must first undergo innumerable triturations and transposi-

tions, climbing the several steps of progress through nature's chemical crucibles, ere they can be nutritiously appropriated by the higher organisms of our culture. Fitness to selection after nature by our arts applied has passed the primaries through the necessary evolutionary processes. This is the order of assimilation and growth. Here is where our chemistry fails us; why its analysis of our soils proves little or nothing in *vital* economy. Nature mixed her waters and atmospheres, bone and develops her children in ways that confound all our boasted wisdom. Why is lime from the bones of animals far better fitted for agricultural purposes than lime direct from the rock? Why is scientific butter from the cream of the cow ninety-nine per cent better than oleomargarine from the chemist's greasy vat? Why are ashes from hard woods better than ashes from anthracite coal that was a coarse-grained forest about a million or more years ago? Why must the delicate rose have a peculiarly fine soil to warrant a blooming that enchants the very air? Ask the divinity in nature. The answer ever returns that success comes by adapting the laws and forces of nature to the instinctive needs of all living dependencies. For plants to grow well and harvest bountifully, for horses to be healthful and spirited, for cows to give rich milk, for any domestic animal to thrive on our lands with profit, for the angels of the household to be developed strong in body and mind, they all must be protected and have food of adaptable quality.

The decayed remains of trees generate acids far more potent than those of grasses that largely form the *humus* of unforested soil. As a test, apply the ashes of wood and the ashes of straw or hay to your crops. The difference is very marked. The ashes of different species and varieties are equally marked. To make substantial soap, the housewife wants the ashes of hard wood; soft wood does not produce the requisite strength and quality of potash. What will make good soap will make good crops. Where hard woods grow, and their decay becomes a cardinal constituent of the soil, is considered the most promising place for fruit plants. Are we of the prairie lands prepared for the hard woods? Our soil may not yet be fitted. The nut-bearing trees, such as the hickory, the walnut, the butternut, the white oak, are waiting their turn for trial. Meanwhile we must pave the way with the native trees of the new Northwest, such as the box elder, the ash, the cottonwood, the basswood, the willow, the elm, the pine, the balsam, the spruce.

As the digestive organs of the body develop food into blood, thence nerve and brain, so do the roots of the trees sip up the decomposing

salts, where they are embedded into their electro-chemical batteries that transform them into new structure, building life-cells, lifting higher its lung-leaves and blossoms that draw from and exhale upon the air nitrogen, oxygen and inter-linking carbonic acid. These with hydrogen and other gases are constantly generating, acting and reacting in nature's chemical laboratories, and by election and selection are ever passing through processes eluding our arts, to be fitted for construction in new forms of life. Take, for instance, nitrogen that enters largely into the constituency of plants; one of them is ammonia, and ammonia is a product of the decay of manures and other fermenting and putrifying substances. But how nauseating and sickening are these gases when just arising from the rotten garbage! When the plant roots have found the filthy stuff and carried its supporting acids upward, reconstructed, refined, vitalized, sun-fused and electrified, a bloom with fragrance and beauty, they are the same gases, but how changed, how inspiring to all sentient things! Now the higher organic creation can breathe such air and live. Thus trees not only fit the oxydizing salts in the soil, and thence their gases, for life-support, but serve to neutralize the breeding of malarious atmospheres.

DANGEROUS DISEASES.

Our State Boards of Health over all the country, maintain that Diphtheria, Scarletina, and other germ diseases are traceable to bad sewerage, barnyard washings in the water, and other unclean environment; and they recommend better drainage and the burning of all possible putrefactions in the way. It is wise, but what health committee or legislation enforces nature's tree-hygiene? The more roots we can get into decaying matter, the safer for all things that live. Cattle men are studying how to eradicate pluro-pneumonia from their herds. Kill them off is the order; but this does not remove the cause. So long as they feed around malarial sloughs, on treeless plains swept by poisoned simoons, compelled to drink water full of deadly miasma and breathe fetid air, subject to excessive heat or chill, microbic germs, latent in their organism, or imbibed by their surroundings, will be quickened into activity, preying upon their lungs and introducing consumption among the people. More forests for the herding cattle and colts with ample drainage of bacterian pools—this should be and must be the governmental order everywhere enforced. To neglect this duty is the unpardonable sin of agriculture. To procrastinate is the robbery of soil and atmospheric nutriment. To

plant no trees and cleanse no "augen stables," is to invite epidemics, then slay our herds and our children. Would there were trumpets of tension loud enough to thunder into some men's ears like an earthquake, and wake them up to a proper sense even of their own weal and happiness.

PRAIRIE PICTURES.

Go west, not farther than the Dakota border, and observe the pitiful dearth of forests on the prairie farms. Scarcely a field, or a pasture, or a barn, or a house is properly environed with trees. Indeed, on some farms not a single tree, or vine, or fruit plant, or cultivated flower can be found. The owner proposes to get rich raising wheat while head over heels in debt, and that continually. There is such a destitution of trees to demark the highways it is most perilous to venture out on a journey over the prairie in winter lest of a sudden a blinding blizzard stab with white daggers. The prairie emptiness when frozen up and down; the prairie dreariness amid wolfish howls of wind, iced in every breath, does make the settler long for the forested East or South whence he came.

We of the farther west are living in the great continental wind-trough that stretches from the plains of Texas to the Saskatchewan, from Eastern Kansas and Nebraska and Western Iowa along the western trails of the Big Woods in Minnesota to the foothills of the Rockies—a trough practically two thousand miles long and five hundred miles wide—territory enough for fifty millions more of people. True, there are belts of forests along the windings of the rivers, and under the enforcement of the timber culture act and the praiseworthy efforts of intelligent homesteaders, here and there is a forest; but in the main this vast extent is the sport and prey of remorseless winds that sweep unchecked from the frozen pole or from the tropic furnace, blasting in winter, blighting in summer; all men and beasts are strung on wire nerves through and through and all over. And don't we have to fight our way against oceans of weeds and devouring insects? against snow-blizzards that stuff a fellow full of borean wrath? against dust-blizzards that fill eyes, ears, nose, mouth and the entire epidermis with dirt and dinge, slimed on in the sweat of labor, till we look like so many resurrected mummies haunting the prairies in familiar companionship with the impudent gopher and jackrabbit?

FERTILITY AND FATALITY.

Our state geologists tell us the force of the winds are two times

greater on the open west than on the east side of our Big Woods; and that cold air in motion extracts heat proportional to its velocity, and with the heat goes moisture. According to this, if the ratio holds, during cold winds, heat and moisture pass off twice more rapidly on the open prairies west of the Big Woods than on the east. Would it not be a defensible scheme to extend the local advantage of the east side over all the western domain by forestry?

Everyone who has lived on the treeless prairie knows that snow, so essential to the protection of our plants and preparation of the soil for next year's crops, cannot long remain there on a level as on woodlands. It may be moist when it falls, but when a cold wind rolls its æreal wheels over, it soon laps up the moisture, and in a few hours cultivated fields are barren again as if swept by a thousand new brooms. With great struggle the fibrils send up their moisture to supply the depleted parts, but this, too, takes wing, and the plants are ruined by "winter seasoning." When the mercury is twenty or thirty degrees below zero, the air chilled to a dead lock, if properly clothed, you can endure the temperature quite comfortably, far more so than when the mercury is ten degrees above, and the wind plays a mad-cap race on the prairie. If you want to cool off a fretful sweat, stand at the northwest corner of your house just fifteen minutes, while old Boreas blows his horn. The experiment will give you some idea of the peril our stock and plants are in when thus exposed. In the summer season, on the open prairie, during the more chilly hours, you can actually see the moisture of the cultivated grounds drifting away on the air waves. At the right angle of observation there looms up to view humid strata, trembling, undulating in the wind, rushing on and on like the sea when vexed with storm. But the charm of it all soon fades into disappointment, when you reflect that the wind is thus savagely bleeding our early crops. Some of our most destructive winds in summer are from the south, almost burning up the very breath, and everything wilts as if touched with fiery flames. Hence, the necessity of forest belts at that point of compass, and elsewhere in the lines of prevailing winds.

WOFUL WASTE

From ten to fifteen per cent of our crops are annually destroyed by winds. The blossoms of wheat, corn, oats, potatoes, beans, apple and small fruit plants are thereby largely robbed of their fertilizing properties, and the harvest is therefore thin and scattering. Sometimes the ground covering to the cereals is swept off and piled up in dirt-ridges, as was the case last spring on thousands of acres.

Did you ever attempt to raise strawberries extensively on the open prairie? After a good enrichment of manure and cultivation, they branch out strong and prolific in July, and they do look so promising for a crop next year; but, of a sudden, comes a wind in saucy frolic, that rips up the half developed roots, twisting and driving them into clumps, poor, forlorn things! Despite the ruin wrought a few take root again, and again the cultivator does its work; and when the ground freezes for winter (following the rules laid down by Eastern horticulturists who may never have seen a prairie, presuming their methods are applicable to all localities), you throw on four or five inches of straw, and say confidently, "lie still, my darlings, safe from harm!" but sometime in March, or earlier, a genuine snorter from the northwest, or other point of compass, pries under the straw and rolls it up into heaps, smothering to death the plants underneath and leaving the rest out in the cold, to frost, heave and dry up. Courage, man! some are alive next spring; how tenderly you foster the brave starvelings destined to be robbed of nearly all the pollen they can produce! But the berries—they are like little child angel visits, few and far between; but enough to warrant the honest report—"We can raise strawberries on the open prairie at a cost of fifty cents a quart—fact!" But, for all that, strawberries and other small fruits, including some of the hardy apples, can in time be made a success, if, lessening no energy in the fruit line, we haste to develop forest belts, evergreens especially, safely enclosing our precious charges at proper distances.

A plea, too, for our stock that suffer so for want of trees. Finding no cooling shade, how the cows madden in midsummer, besieged by flies sucking out their life-blood! How the beautiful colts, finding no thicket to escape into, dash along the barbed wire fences, slitting up their ears, tearing open their breasts, maiming themselves perhaps for life! Such a fence is the most devilish thing ever made; but has the farmer a just reason to curse the inventor, while the injury to his stock may be mainly due to a famine of trees in his pasture? Nothing creates such a reign of peace among stock as trees. Reposing under their green arches, the cattle there chew their cuds in sweet satisfaction. The horses there huddle together, their heads resting upon each other's necks half asleep, and near by the sheep with their noses close to the ground to sniff the coolest air. How well they appreciate their master by good behavior!

It is problematical whether, in the long run, thoroughbreds can retain and transmit their superior points and qualities, pastured and fed

in a treeless country. Environment develop corresponding attributes in everything else; why not in stock? Some of us settlers, known in the East for our Christianly mild disposition, have, strangely to relate become ill-tempered, living on the treeless prairie. Like man, like horse or dog, your answer.

Our business, too, will materially suffer, and that very soon, unless we early and promptly attend to forestry. We are fast depleting the valuable timber. Whereshall we get our supply in the future for fuel and manufacturing? What are we doing to compensate for the loss? Doing? Why, cutting and slashing where there is anything of the kind left, with a vandalism more implacably avaricious than ever characterized the feudal ages. By mathematical measurement it is found that our Minnesota river drainage has an area of 19,000 square miles, nearly destitute of forests; the upper Mississippi drainage is about 23,000 square miles, mostly forested; thus the Mississippi has about a quarter more drainage than the Minnesota, and yet at the confluence of these rivers near St. Paul the Mississippi gives us seven times more water than its competitor. There can be no other cause for this disparity than the water ratio between a treeless and a forested country.

The Minnesota is largely fed by springs from the Coteaux in Dakota near the western boundary of our State, a mountainous rampart stretching nearly north and south about seventy-five miles. These springs flow down numerous ravines wherein long, zigzag forests, have been growing for centuries. In keeping with the marauding instincts of the whites the Sisseton Indians are using up the great trees for wood to sell in our markets. Are they blamable? You would not think so were you to inspect their condition. Something should be speedily done by Congress to preserve these forests, and thereby preserve intact the headwaters of the Minnesota, whose valley cannot be excelled for richness and for business that leans dependently upon the river for refreshment to crops and force to manufactures.

The same depredation, on a larger scale, is going on around the sources of the Mississippi—fast slaying and burning the forests. If not soon arrested, the whole climate of the State and contiguous states will be colder and drier, irreparably damaging agriculture and all its correlative branches of industry. Not only such calamities will follow, but the whole country along the river channels will be subject more than ever to great floods, spreading ruin in their march to the south.

POINTS TO PONDER.

Not only do forests trap the snows and rains, holding back the spring floods, but, by their shading leaves and limbs, they check excessive evaporation, thus husbanding moisture for more equable and economical distribution and increasing the precipitation, which in Minnesota is but twenty-eight inches. Not only do they serve as media that connect the minerals of the soil with the gases of the atmosphere to fit them for appropriation by the higher organisms, largely neutralize the breeding and ravages of germ diseases, protect our rivers and lakes from drying up, break the force of destructive winds and shelter our State and homes, but they invite hither the furry animals to people again the woody retreats, and insect-devouring birds that save our crops to a large extent from the depredations of parasites on all our plants in field and garden; they conduct electricity between the air and ground, and quicken all living things into new vigor; they furnish healthful acids and fragrances for man and beast; they spread their humid mantles over us, warming the landscape in winter, cooling it in summer; they check the escapement of heat at night and send it back to the plants safe from killing frost; they beautify all the country, evoke poetic and artistic thought, inspire lofty endeavor and nobility of character.

Summing up all these benefits, which are but a moiety of the great whole, can we in justice to ourselves and future generations postpone the matter of forestry? It is possible and practical for us to bridge over the continental wind-trough of which we spoke, with a humidity that will transform it into an Eden. As it is now, the rain-sheets from the Alleghanies and other mountained regions of the east, expend their force ere they reach us; and the rain sheets from the Pacific, winged eastward, surge against the western slopes of the Rockies, cutting off supply from that direction. Thus the richest part of North America becomes almost neutral ground, less subject to precipitation than more remote localities that have soils far inferior. Being mostly treeless prairie, the north and south winds, deflecting southerners nearly in the same direction, driving hot or cold daggers into everything, produce an excessively dry atmosphere which would speedily change our adopted country into another Sahara, were it not for porosity of soil and understrata of clay that reserve what water filtrates through to feed the roots in seasons of drouth. Under all these local disadvantages, the great enterprise of conquering a climate suggests itself. If all the provinces and states in the Red river and

Mississippi valleys from Hudson's Bay south to the Gulf of Mexico, would pull together, and with munificent appropriations reclaim by forestry all the now barren regions, constructing dams across the outlets of the innumerable, spring fed ravines to hold back the surplus waters running to waste, and induce the thousands of farmers throughout the mid-continental domains to develop each ten acres of native trees; if our own State, co-operating with Dakota and Manitoba, would embank the deep basins in the far north, converting a wild and desolate expanse into great lakes over which the polar winds blowing, will bring to us vapor blessings instead of frigid curses; if Congress would early execute the late recommendation of the Commissioner of Agriculture at Washington by the construction of vast water reservoirs among the Rocky Mountains, wherewith to irrigate bountifully all the plains below, and bring to our prairie lands, laden on every breeze from these elevations, supplies of rain, and moist, and dew, and protecting snow; if all this be done with unity of force, within our century we shall have initiated a conquest over our climate, whose beneficence cannot be measured. Is not the enterprise feasible? A people that has vanquished the wolf, the savage and the great rebellion, can accomplish anything.

FORESTRY PROTECTION.

By Clarence Wedge, Albert Lea.

I understand that our Society spent much of its time at its last meeting on the subject of forestry. I wish to heartily commend its course. A very practical way of getting hardy varieties of fruit is to reduce the hardness of our climate; and when we shall have accomplished this by systematic forestry, fruit will be one of the lesser blessings following in its train.

Protecting, extending and systematizing our forests is one of the police duties the State owes to its people. We need protection from blizzards almost as much as we do from burglars. Great belts should be planted in the prairie districts, belts half a mile wide, extending through each township east and west, north and south, forming a network of barriers to our storms. Waste land, swamps and bluffs, should be given a leafy covering, and be made to contribute to the public welfare by holding the snows of winter and the rains of spring for our summer drouths.

The necessity for this work is urgent, and the benefits resulting therefrom will be universal. And when to this general and public work is added the evergreen shelter belts which every farmer should erect about his home and barns; and the rows of elms, maples and walnuts which should line our highways and avenues, we shall have completed the transformation of a snowy wilderness into the happy garden spot of the earth.

Albert Lea, March 1, 1888.

The following paper by Robert Hale, secretary and treasurer of the Minneapolis Board of Trade, was then read:

GARDENING AND FLOWERS

By Robert Hale, Minneapolis.

Mr. President, Ladies and Gentlemen of the State Horticultural Society:

When invited by your President to prepare and read a paper upon some branch of horticulture, I was not a little astonished, as I never laid claim to a sufficient amount of knowledge of any branch of this complex science to prepare a paper that would be either interesting or instructive to an audience of practical horticulturists; but having a great love for all pertaining to the science, and in early life some practical experience in agriculture, and in the past few years in cultivating a town or city garden, I consented.

It will hardly be expected at this time, when there are so many able publications, and books treating the subject, by some of the most learned men and women of this age, who have treated all branches of agriculture and horticulture with eminent ability, that anything very new or original can be produced by an amateur.

I have read many of the works and found great pleasure in them, as well as cultivating my garden. What may therefore be expected can hardly be more than the thoughts and views of many others, commingled with some of my own personal experience.

The subject to be considered by this paper is that branch of horticulture relating to gardening, and the moral influence of flowers and the cultivation of them. The subject will be briefly treated under four (4) heads.

1. Market gardening.
2. Farmers gardens.
3. Town or city gardens, and
4. The moral influence of cultivating a garden and flowers, and of flowers.

By horticulture as a general term is understood to embrace all that part of the culture of the soil which pertains to the cultivation of fruits, vegetables, flowers and all that pertains to the ornamentation of grounds, and some adornments by means of everything growing out of the soil.

The first and most important consideration in the cultivation of any garden is the soil and location or situation.

It is of great importance that the soil be adapted to the purpose, and to receive the warmth of the sun in that part of the day between the middle of the forenoon and the middle of the afternoon.

A soil containing a large proportion of loam with a small proportion of sand, or sandy loam, with good and ample drainage, either by the natural slope of the land—or if too flat for natural drainage—under or tile drains—and with a southwestern inclination, is the best.

Heavy clayey soils are not so well adapted for garden culture, but if only such can be had, it can be greatly improved, by the application of sand, or sandy loam, in proper quantities, and with plenty of fertilizing material of the proper kind—all thoroughly incorporated by well and thorough mixing and cultivating.

The importance of thorough drainage cannot be too strongly urged—for no vegetable can grow in pools of water.

Whatever the character of the soil, or location, the best success with any crop will depend on the quantity of manure applied, which must be thoroughly mixed by cultivating, and the more thoroughly this is done the more certain will be the crop. From my own experience I feel warranted in the assertion that with plenty of manure, and the required amount of labor to incorporate them—the elements combined so that the roots of young plants may reach and take in the elements of plant life, will be certain to produce a good crop even though the season may be unfavorable. This will hold true in nine cases out of ten.

If any other requirements should seem to be needed, I should emphatically recommend frequent applications of liquid manure, and frequent stirring of the earth, or cultivation. In my own garden I use liquid manure for all flowers and a few vegetables, no matter what the condition of the soil may be—with good effect.

The last, and one of the most important considerations for good crops in any garden is that all weeds should be exterminated as soon as they appear. They are to a garden what anarchists are to enlightened society, and neither should be suffered to exist, but be eradicated—exterminated upon first appearance.

MARKET GARDENING.

In the immediate vicinity of cities and large towns, the cultivation of vegetables and small fruits for the daily supply of the market has become one of the large industries, and in our own country employs a large army of people of both sexes. In the cultivation of vegetables for market, the land should be laid out, and the rows such distance apart as admit of the largest part of the work to be done by horse cultivators; the longer the rows when so laid out, the more economical the cultivation of the crop. In this class of gardening, the owner if well versed in his business, should and will arrange for the earliest vegetables that can be grown, when followed by others throughout the season, and of some kinds, several crops may be raised on the same land. It will be of great advantage, and increase profit to the owner, to start many kinds of vegetables in hot beds, which are not expensive, and even raise them in such beds for market, before they can be grown in the open air.

Of the particular kinds of vegetables to cultivate for market, the intelligent gardener well understands, and will arrange to have them, or some of them for all seasons, and the small fruits in their season, strawberries, raspberries, blackberries, currants, etc., all of which find a ready market in their season, at good prices.

The best method of cultivating any one of the garden vegetables, or small fruits, would require an entire essay, and many have been written, and I have no doubt been read by every person in the audience, and I omit anything further on the subject.

FARMERS GARDENS.

I am aware that few farmers plant and cultivate such gardens, as they would find of great benefit and profit in cultivating, and the oft assigned reason is, other and more important farm work, want of time, etc.; when garden work is necessary to be done, such are not valid reasons. The preparation of a garden plat, plowing, manuring, etc., will require but little time, and when seeds are provided, and on hand, either raised or procured from the seedman, before the com-

mencement of farm work, but little time needs to be taken from other work to do the planting, and much of the care of it can be done by the children, and odd jobs by farm help. Every farmer's garden should be set with all the small fruits, which will require but little attention for years.

I remember reading an able article several years ago, by the late Geo. Geddes, of Syracuse, N. Y., who was one of the best writers (as well as farmers) on agricultural subjects, that I have read, in which he says, that the average farmer entirely underestimates the value of the products of a good garden, as it would supply a large part of the living of the family, and at the same time increase the health and pleasure of the whole family, workmen and all. I can fully confirm the statement, by my own experience in early life as a farmer, and later as a gardener to a small extent.

TOWN OR CITY GARDENING.

The writer cultivates a vegetable garden in this city, and has for several years, making no pretensions to scientific skill, but has been successful in obtaining a large quantity of vegetables and small fruits from a small plat of ground; all the bed vegetables—corn, potatoes, beans, squashes, tomatoes, melons, cucumbers, pie plant, horse radish, lettuce, radishes, etc., etc., with an abundance of currants and raspberries, and a much larger quantity than the family can consume. I have raised five or six crops of radishes, and the last season two crops of beans on the same land; the seed of the second was from the first crop on the same ground, and we had an abundance of string beans before the frost, and if I had planted them as early as I could, we could have had shell beans before frost. The plat of the second crop, a beautiful light green, after all the other vegetables ripened and passed, were as handsome as any portion of my flower garden. Every person understands the advantage of being able to gather from one's own garden any of the vegetables or fruits over those obtained from the green grocer, which may have remained over for days and withered, or far from being fresh. I regard the labor bestowed upon the cultivation of my garden as one of the best investments I could make; the result is very great pleasure and greatly improved health, therefore I make the most of it, and do all the work myself except cutting the grass on the lawn

MORAL INFLUENCE OF THE CULTIVATION OF FLOWERS—AND OF
FLOWERS.

The cultivation of the beautiful should be the desire of everyone. Goethe's beautiful sentiment, "Cultivate the beautiful, for the useful encourages itself," is worth remembering and practicing. "Flowers," says Ruskin, "seem intended for the solace of ordinary humanity—children love them; quiet, tender, contented ordinary people love them as they grow; luxurious and disorderly people rejoice in them gathered. They are the cottager's treasure, and in the crowded town mark as with a little broken fragment of rainbow the windows of the workers in whose hearts rests the covenant of peace. To the child and girl, to the peasant and manufacturing operative, to the Grisette and the nun, the lover and the monk, they are precious always."

I have a great pity for any one who does not love flowers.

"The love of the beautiful never becomes extinct in the human soul. It may be crushed by selfishness and avarice, blurred and stained by sin and crime, but deep in every heart the latent spark remains, and needs but some purifying influence to spring it into healthy action."

"Flowers," says Pliny, "are the joys of the shrubs that bear them," and that eminent observer might have added, "and those who cultivate them."

The health and pleasure derived from the cultivation of flowers to those who love them are of the highest importance. I never pass the dwelling of a person in whose yard or window I can see but a solitary flower, but that a feeling comes to me that within is a cultivated taste, a kind and loving heart, and a happier home than where no flowers are seen.

The list of flowers I usually plant are: Geraniums, pansies, verbenas, heliotrope, rose geranium, phlox, of variety; nasturtium, feverfew and golden feverfew for borders, on account of colors; sweet allysum, balsams, foliage plants (colors), tulips, hollyhocks, peonies, lobelia, portulacca and poppies. They are planted without regard to scientific combination, but very much as wild flowers grow on the prairies or in the woods, considerably mixed.

The writer has never seen a flower, either wild or cultivated, that was not handsome; nor have I, in a long life, seen a person who loves flowers that was a bad person. Of late years I have derived more real pleasure and happiness from the cultivation of a few old-fashioned flowers than many a man with his millions.

My own pleasure is not all, for *mine* is by no means diminished, if others, strangers and neighbors, derive pleasure by seeing them.

During the past years I have had ladies call and personally thank me for the pleasure they have derived from viewing them as they passed. I have frequently seen people passing, suddenly stop, and use such expressions as "Beautiful!" "Ain't they handsome!" and others similar, and I plead guilty to a little vanity—if that is the best name—that others are pleased at the little I have done; it adds greatly to my own pleasure. Nothing has, however, given more pleasure than to see a class of persons having a taste for flowers but not the means of obtaining them come round to view mine. I allude to nurses in charge of little ones in their little carriages; and I have seen the past summer at one time five of this class apparently deriving pleasure from seeing the flowers.

I have a little neighbor, one of the finest children I ever saw, just able to walk and talk, who loves flowers as well as I do, and when he visits me he always gets a few for himself and a few more to take to his mamma, and with the sweetest smile I ever saw on the face of a child, the "thank you" he never forgets to return is to me the highest compensation that could be returned. I love that child, and all others that love flowers.

Who can measure the happiness and pleasure, not to mention the advantages to the health, to the poor and sick, who are supplied by the Flower Missions!

I am sure they are great, and hope such missions may be extended to every town and village in the land where none now exist, even if none others than wild flowers can be had. I have quite a number of very pleasant notes from friends to whom I had sent flowers when sick, and from some who were not sick, which are very gratifying. So great do I consider the refining, and, if you please, the Christianizing influence of flowers, that I would have all school children taught how to grow them; and I would have a bed in the yard of every school-house, at the cross-roads, in the village and city, as well as in the yard of every prison and reformatory institution in the land where the unfortunate are kept for the safety of society; and in every park where people go for pleasure; and in every cemetery where the remains of dear ones are deposited. Some of the latter in the East are the most beautiful places I have ever seen, and I hope the custom will become general.

At the present time, the only apparent use of life seems to be to obtain great wealth—a reasonable amount does not satisfy, and in

order to obtain it with greater rapidity than individual efforts can accomplish, "trusts" of all kind are formed, which are none other than combinations to put up prices of all articles to consumers and compel them to pay unreasonable prices—light, fuel, bread-stuff, meats and almost every article of daily consumption. Such are the causes now so often heard of the cry of oppression, and not without reason. This is a digression from the main subject, but is admissible only on the ground that a halt should be called and the rising generation educated in a different way. In my experience, with a few exceptions, any great amount of wealth is not a source of greatly increased happiness. I would, had I the power, teach the young to love the beautiful, and be satisfied with a moderate share of this world's goods.

I have recently been interested in reading some accounts of a lady of great wealth, mainly inherited by herself and husband, who has distributed hundreds of thousands of dollars, and the manner she used it, to benefit those less fortunate than herself,—the late Mrs. Astor, of N. Y. I am of the opinion the lady received more real happiness in giving than the recipients in receiving. I will read a short article taken from a late paper of that city.

"Beneath a glass case in one of the magnificently furnished rooms of the Astor mansion, at Fifth avenue and Thirty-third street, were some wax flowers and other little fancy knick-knacks. If put up at auction to be sold on their merits, the whole lot would hardly have fetched the price of a song, certainly not of a popular imported song when it first comes out. The workmanship was neither skillful nor artistic. It was exceedingly amateurish. And yet, surrounded as she was by beautiful pictures and other costly products of skill and genius, Mrs. Astor prized highly these exceedingly rudimentary attempts at art, and gave them an abiding place among her treasures.

"To a few favored friends she would explain why. They were the offerings of childish hands. They were given her by poor children, into whose lives she had brought sunshine and happiness, and lessons of goodness that might bear fruit in later years. They were voluntary offerings from the children of the Industrial School in East Fourteenth street, near Avenue B, which Mrs. Astor founded nearly twenty-five years ago, and which she watched over with loving care while she lived, although the school was under the supervision of the Children's Aid Society. Mrs. Astor loved children, and prized these humble gifts because they were mementoes of childish affection which she had won. They represented that which wealth could not purchase. Truly their presence in the Astor mansion was significant of much."

I have been informed by a person who was an intimate acquaintance of the lady, that she was passionately fond of flowers, and I imagine that, with the additional pleasure of seeing the efforts and results of children, who no doubt also loved them, and who she had aided—and who had only been able to produce very imperfect imitations—were the two causes why she gave them so conspicuous a place among her costly works of art.

Mr. President, if you and your associates think this an unwarranted digression, it only proves the great mistake you made in inviting me to prepare a paper.

Finally, whatever conduces to the pleasure and happiness of the people, if useful and elevating, and which will elevate the aims and purposes of life, should be encouraged. Such, to me, is the aim of your association, and the result of the untiring labors of your Society; for the twenty-one years you have devoted to it, will be felt long after your work has been finished. I may be permitted to say, that I am well aware, in this rigorous climate, much has to be done beside cultivating the beautiful, and few can spare the time to do very much; but the example on a small scale, and by a small proportion of the people, will exert a far greater influence than many people believe. Many people, at this time wholly occupied in business affairs, apparently think it a small matter, and beneath their notice, to give time or attention to the adornment of homes. Whoever entered the parlors of a friend, where but a few old fashioned flowers are seen on the mantel, but were pleased. No marriage ceremony can be consummated without beautiful flowers; nor the last rites of burial of dear friends without them. They are beautiful at all times, and everywhere, and exert a powerful influence for good.

My eyes have never beheld a more beautiful and inspiring sight than is seen on the table in front; no artist was ever born that can equal nature; they may, and do, approach very near. The God I worship is as beautiful and lovely as the most beautiful of his works, which surround us on every hand—with no hate or revenge, but who would have all His children as good and pure and lovely as these beautiful flowers.

“Look at the lillies, how they grow.”

’Twas thus the Savior said, and we,
E’en in the simplest flowers that blow,
God’s ever watchful care might see.

“Shall He who paints the lillies’ leaf,
Who gives the rose its scented breath,
Love all His works, except the chief,
And leave His image, Man, to death.”

" There is not a flower can grow upon the earth
Without a flower upon the spiritual side ;
All that we see is pattern of what shall be in the mount
Related royally, and built to eteine significance."

THERE IS NOTHING SMALL.

" No lily, muffled hum of summer bee,
But finds its coupling in the springing stars,
No pebble at your feet, but proves a sphere,
No chaffinch, but implies a cherubim."

" Earth is full of Heaven,
And every common bush afire with God."

DISCUSSION.

Mr. Dartt. I wish to call attention to the blighting of fruit last season. Some ten days before blossoming time last spring we had a snow storm and frost. I examined the fruit buds after that and found the blossoms literally full of insects, that are known, I think, as thrips; they were of all sizes from a sixteenth of an inch to the merest speck. They seemed to be moving about but I did not know why they were there; and it is a question with me whether those insects did not destroy the plum crop last season. The blossoms remained a short time and then withered.

Prof. Porter. My theory in regard to the loss of the plum crop is that it was mainly caused by the dryness of the atmosphere at that season and a want of fertilization of the fruit blossoms.

Mr. Urie. Might not that condition have been avoided by spraying the trees? I knew a man in Illinois who raised large crops of plums every year, and he sprayed the trees with warm water.

Mr. Harris. The cause of the failure of the crop last year was no doubt the dry weather. Spraying of the trees might be of advantage.

Col. Stevens. There is a valuable plant growing wild on the prairies in Dakota that ought to be cultivated generally, it seems to me it is very valuable. I refer to the shrub *Sheperdie argentea*.

Mr. Gibbs. The Dakota Horticultural Society mention it as one of the wild shrubs or trees, which it recommends for general trial. It grows wild in both South and North Dakota. It is probable the seeds were brought by birds. I have it growing on my farm.

Prof. Porter. I have experienced difficulty in the germination of the seeds and would like to know how to grow it

Mr. Sias. Mr. Benj. Bear of Eyota, a friend of mine, when coming

across the plains brought some sprouts of the buffalo berry and planted them. I was at his farm several years ago, and found his trees eight or ten feet high and literally loaded with fruit. He gave me a number of trees which I have set, and they are looking fairly well.

Prof. Porter. I shall get trees from the Sisseton reservation, as I am informed they grow there in large quantities.

Col. Stevens. I was there in an early day and did not find them. I think you will find plenty of them at Devil's Lake. They bear transplanting very well.

Mr. Sias. I planted a pint of seed and had the same trouble with them Prof. Porter speaks of.

Prof. Porter. I consider the buffalo berry one of the most promising trees we have.

Mr. Brand said, J. H. Brown, of Lac qui Parle county, had a good many other trees in his garden. He had examined them and considered them a nuisance as a hedge.

President Elliot had received a number of the plants from Fort Lincoln, three years ago, a part of which had lived, but he had doubts as to their value for a hedge.

Col. Stevens. As a hardy plant there is nothing superior. It grows at Fort Buford without sprouting out at all. It is one of the finest plants we have in the northwest for ornamental purposes and for a hedge; I am not speaking of its fruit.

Mr. Smith. Are there not two varieties? I have seen those that succored very little.

Col. Stevens. I think there are two varieties.

Mr. Urie. Chas. Hoag has them growing in North Minneapolis.

Col. Stevens. The fruit is almost equal to a currant after the frost.

Mr. Gibbs. The Shepherdie is on our list for trial. There are characteristics about it that make it very attractive. It is an ornamental plant. It is the latest tree to hold its fruit that I know of and it keeps its leaf until late, and is valuable on that account.

Mr. Smith. It bears cutting well.

Mr. Gibbs. Yes, and it is almost independent of drouth and bears abundantly; one of those plants adapted to a dry country. It seems to be at home in the arid regions of Dakota; where the annual rainfall is less than twelve inches. For an ornamental hedge it must be desirable. The fruit is good but it takes quite a time to fill a box with them. The flavor is similar to that of the cranberry; it makes nice jelly. If any of the horticultural experiment stations in this State

want specimens of the plants for trial I shall be glad to supply them.

Prof. Porter. I shall be glad to give you an order and to pay for all expenses, as I am exceedingly anxious to propagate it. I have not had success in making the seeds grow.

Mr. Pearce. Plant them in the fall under a board and I think they will grow.

Prof. Porter. I planted seeds a year ago in October.

Mr. Harris. They may come next spring. I planted some plum pits that failed to grow the first year.

Prof. Schotzka. Mr. Chairman, nature teaches us that these berries remain on this shrub during the winter; if allowed to remain till spring and then planted when they are ready to drop they will grow more readily. The same holds good with cranberries. The seed will germinate five days sooner than if picked when they first ripen. One thing I wish to mention in regard to the larch being hardy. When it stands alone it is the hardiest. Norway Spruce is the hardiest when the trees are grown close together. A larch twelve years old is worthless for fence posts; the wood is spongy. We have to ripen the wood and then it is valuable for any purpose.

Mr. Pearce. Is the larch good for posts?

Prof. Schotzka. It is just as good as any other wood, except red cedar and locust, which are the most durable of any timber we have for posts.

Mr. Pearce. How long will it last?

Prof. Schotzka. It lasts fifteen years. Where the area in timber is limited there should be greater economy used with wood and timber. Posts may be preserved, and will last twice as long if they are charcoaled.

Mr. Fuller, from the committee on the president's address, presented the following report, which was adopted:

REPORT ON PRESIDENT'S ADDRESS.

The committee on the president's address would call the attention of the Society to the following recommendations:

1. We recommend that the committee on legislation continue to look after the tree law and secure any amendments found desirable.
2. That the same committee, or a new one be appointed, to secure an efficient law to protect our State from the depredations of the incoming English sparrow.
3. That the same committee, in connection with the forest tree

committee, also secure the best law possible to secure the forests of our State.

4. That the culture of small fruits be urged on all our people, in country and village, and that amateurs use only the old and well known varieties.

5. That the dissemination of information in regard to fruit growing and tree planting is very desirable, and that the press, and especially the platform of the farmers' institutes, should be used for this purpose.

G. W. FULLER,
J. S. HARRIS,
A. W. LATHAM,
Committee.

The report of the committee on legislation being called for, Prof. Porter said there was nothing special to report that had not been pretty well ventilated during the present session. A larger number of copies of the transactions of the Society should be printed, and more of them should be bound in cloth. He wished to emphasize what the Secretary had said on this subject in his annual report. It was better to have fewer copies printed, if need be, and have more bound volumes.

Col. Stevens, from the committee on final resolutions, presented the following which was adopted:

FRUIT RESOLUTIONS.

The committee on resolutions would respectfully report:

That we desire to thank the citizens of Minneapolis, for their hospitality during the session of the Society. We also desire to thank all of the railroads that reduced their regular rates for the transportation of the members of the Society in attendance at the annual meeting.

The committee would also recommend the continuance of the committee on seedlings and fruits for another year.

Mr. Smith moved that the question as to the publication of the prize essays be referred to the committee on publications.

Col. Stevens. Would it not be better to print all of them?

Mr. Pearce. I think not; to print those that received the prize will be sufficient.

The motion of Mr. Smith was carried.

Mr. Pearce extended an invitation to the Society to hold its summer meeting at Lakeside Nursery, near Lake Minnetonka, and promised

to see that ample accommodations were afforded to members of the Society in attendance.

Secretary Hillman called attention to the meeting of the American Horticultural Society in California.

Mr. Harris said he understood J. T. Grimes would represent this Society at the session held at San Jose. He moved that President Elliot be requested to act as a delegate if possible to do so at the session to be held at Riverside, in February.

The motion was adopted.

On motion of Mr. Pearce the Executive Committee were authorized to appoint delegates to horticultural meetings.

Mr. Harris moved that the salary of the Secretary for the ensuing year be fixed at \$500; of the President, \$25; of the Treasurer, \$25; of the Librarian, \$10; that the Vice-Presidents be allowed their traveling expenses on making a report for their several districts; that members of the Executive Committee be allowed mileage or traveling expenses when necessarily called together. Adopted.

On motion, Messrs. Harris, Sias and Wilcox were named as a committee to make and present at the next annual meeting a catalogue on fruit.

On motion of Mr. Smith the meeting adjourned *sine die*.



SECRETARY'S PORTFOLIO.

DEFERRED PAPERS, REPORTS, NOTES, EXTRACTS, ETC.

INTRODUCTORY NOTE BY THE SECRETARY.

We are much pleased with the high order of the essays, papers and other contributions which appear in this report. A great variety of subjects are thoughtfully considered, evincing an awakened and lively interest in the cause of horticulture, as well as kindred topics.

Garfield, the model secretary of the Michigan state society, says: "I earnestly believe there is no occupation in the world that may be made so delightful and captivating as horticulture." This is a proposition he no doubt has proved to his own satisfaction by personal observation and experience, since he is both a practical horticulturist and indefatigable worker in literary fields as well; and in connection with his report he furnishes each year a valuable and interesting portfolio.

It would afford us pleasure to follow his example by gathering together some of the numerous articles, items, editorial gleanings, and the like, which may be found from time to time in leading papers and horticultural journals of the land. But as our space is limited we must give room in our reports to matters mainly of a local nature and seek from year to year as far as practicable, to furnish a faithful outline or history of horticultural progress in this State. In our report of the proceedings at our annual meeting, we have endeavored to condense to some extent in order to avoid unnecessary repetition and save sufficient space to bring the present volume within a proper limit as to size. We therefore feel compelled to limit the succeeding pages somewhat, although omitting many worthy things of real interest and value.

IN MEMORIAM.

Following is the report of Committee on Obituary :

During the past year death has taken from us William Cannon, an old and highly esteemed member of this Society. He was formerly a resident of Minnesota, but for several years past had resided at Fort Abraham Lincoln, Dakota.

PHILO WOODRUFF.

The subject of this sketch, an honored member of this Society, and one of the pioneer horticulturists of this State, died April 21, 1887. The *Faribault Republican* of April 27th, says :

"Hon. Philo Woodruff, a well known and highly respected citizen, died very suddenly of heart disease, at his home on First street in this city, on Thursday evening last. He had been in his usual health until within an hour or two of his death.

"Mr. Woodruff was born near Binghamton, Broome Co., N. Y., in April 1815. His father was a Calvinistic clergyman. The son came west to Indiana, when a young man, attended college at Crawfordsville, and while completing his education worked during vacations at carpentering and other mechanical trades. He assisted in the building of the first Presbyterian church erected in Fort Wayne, Indiana. He lived at and near St. Joseph, Mich., until 1852, when he went to California. He came to Minnesota in May, 1855, and settled on a farm in Waseca county, and was prominently identified with the early development of his county. He was a man of good education, and possessed of much general information. He represented Waseca county in the legislature in 1864, and for four years after was engaged as special examiner and appraiser of lands in the Sioux reservation. In 1856 he planted a quantity of apple seeds, from which he raised a number of fine seedling apples, which were productive for a number of years. In 1857 he sent to Washington and got some Sorghum seed; that fall he made the first syrup made in Waseca county, if not in the State. In June, 1846, at Cleveland, Ohio, he was married to

Mrs. Elizabeth A. Cable, a very esteemable widow lady, whose maiden name was Craw, and who survives him. Mr. Woodruff was a firm believer in the religious doctrines of Emanuel Swedenborg, and was very zealous in propagating them. One among the last acts of his life was the gift of a case of new church books to the Faribault Public Library."

CHARLES HOAG.

Charles Hoag died Wednesday Feb 1, 1888, at his late residence 528 Aldrich avenue, Minneapolis; in his 80th year. The immediate cause of his death was water on the heart, but his last illness may be traced to a fall which he received while picking cherries in October.

Charles Hoag was born at Sandwich, N. H., June 29, 1808, and was educated at Wolfboro Academy and a "Friends" school in Rhode Island. At the age of 15 he commenced teaching and remained in that profession until he was 42 years of age. He was principal of a Philadelphia, Pa., grammar school thirteen years, and came from that city to Minnesota in 1852, bringing with him a cultivated taste for trees, fruits and flowers, acquired in that staid city. He took up 160 acres of land, a part of which now forms the site of the West Hotel in the city of Minneapolis. He was a member of the first council, second treasurer of the county, and superintendent of schools four years. In 1874 he removed to his farm "Diamond Lake," Richland township, and resided there until some three years since when he returned to Minneapolis. Within a few weeks after his arrival in the then frontier settlement he had the distinguished honor of giving the name Minneapolis, a combination of the Greek and Indian tongue, (literally water city) to the little hamlet of scarce a dozen actual settlers, which has in less than forty years grown to be one of the largest, busiest and most beautiful cities in the Northwest.

During the early years of the city he was a man of wealth and influence, and a recognized leader in all public improvements, but the panic of 1857, as with hundreds of others, caught him with his real estate heavily mortgaged, and he was only able to save enough from the wreck with good management to make his old age comfortable and leave his widow independent for life. Mr. Hoag was twice married. His first wife died in 1871, and two years later he married Susan F. Jewett, who with his daughter, Mrs. Charles Clark, and a brother, Levi Hoag, now living in Wright county, are his only surviving relatives.

The writer first formed his acquaintance at the State Fair at Roch-

ester in October, 1866, and became attached to him for his many virtues, generosity, hospitality and hearty co-operation in all efforts for the development of the agricultural and horticultural resources of Minnesota. He was present upon that memorable occasion Oct. 4, 1866, and took an active part in the meeting that resulted in the organization of the State Horticultural Society, then named the Minnesota Fruit Growers Association; became a member from the start, and was elected the first vice president, Col. D. A. Robertson of St. Paul having been elected the first president. At the same time he was a prominent member of the State Agricultural Society, and at the next annual meeting of that society advocated the cause of the Fruit Growers Association by offering a resolution that some means should be adopted to procure from Russia for naturalization in Minnesota, apple, pear and cherry trees. At the next annual meeting in 1867 he was re-elected vice president.

At the meeting held at Minneapolis, Oct. 1, 1868, he was elected president of the Society, which position he filled for one year with honor to himself and profit to the Society. His name also occurs among the charter members in the act of incorporation of the State Horticultural Society. At the annual meeting held at Minneapolis Jan. 16-18, 1882, he was unanimously elected a life honorary member of the Society. He attended nearly all the meetings of the Society and usually took an active part in its deliberations, and by his wise counsel and hearty co-operation in all measures that would tend to advance its interests, has endeared himself to the old pioneers who survive him.

The Committee on Obituary recommend that copies of the transactions for 1888 containing the above notice be put up in extra binding and presented to the widow, Susan F. Hoag, and the daughter, Mrs. Charles H. Clark, and the brother Levi Hoag.

The following is clipped from the *Minneapolis Tribune* :

“THE NAMED OF MINNEAPOLIS.

“There will be carried to its final rest to-day the body of a gentleman who played a leading part in the early history of Minneapolis; but who, owing to increasing age and infirmities, has for some years been in retirement, and has therefore been little known to more recent comers. We allude to Mr. Charles Hoag, or ‘Uncle Charley,’ as he was familiarly known.

“Mr. Hoag was one of the original settlers of Minneapolis, having

a claim upon which are now located some of the most valuable improvements in the city—notably the West Hotel. There were not a dozen actual settlers west of the river at the Falls of St. Anthony, now nearly forty years ago, when Mr. Hoag arrived here with his family, and within a few weeks of his advent here he had the distinguished honor of standing god-father for the new frontier settlement. Having been a school teacher in the East, he conceived the idea of combining in the name of the new settlement a word from the ancient Greek and one from the Indian tongue, hence the name, Minneapolis (water city, literally). There are one or two old settlers still living who were present as the little company of residents gathered at the christening. A multitude of names of the Smithville, Brownstown, Jonesburg order were suggested, when a ballot was ordered and taken, after an eloquent appeal by Mr. Hoag, ably seconded by Col. John H. Stevens, and the name Minneapolis was chosen on the first ballot.

“Mr. Hoag was noted far and wide for the pioneer virtues of generosity, hospitality and benevolence. His hearth and home were always open to his old friends and associates; and the hearty tones of his welcome will linger long in the memory of his intimates.”

ILLUSTRIOUS DEAD OF 1887.

Outside of the circle of our own State and Society, the death rate of men, who have had much to do with the advance of horticulture, during the last half century in Europe and America, has been more than usually great. It admonishes us, that we too who have borne the heat and burden as pioneers in our own Society, will ere long receive a summons to come up higher and join that larger society, that meets “over the river.” It is also a source of sincere gratitude, that a kind providence has spared so many of them, to ripe old age, to see the fruits of their labors. We can here only mention the names of a few, who are most widely known.

Mahler Moon, the well known nurseryman of Morrisville, Berks county, Pa., died on the twenty-fourth of January, in his seventy-third year. He was a genuine lover of flowers, and a nurseryman noted for his strict integrity.

Henry Ward Beecher died March 8th, in his seventy-fourth year. Though not a professional horticulturist, he was an earnest devotee of the art, and had much to do with the increase of horticultural taste, during the last fifty years, and thousands have been brought, through

his example and precepts, to have a pleasure in gardening they would not have known, had he never lived.

James Powell, one of the old time florists of Philadelphia, died April 17th, in his seventy-third year.

John B. Moore, whose name is familiar to grape and rose growers everywhere, died August 22d, at the age of seventy years. Few men have labored more earnestly to improve the American grape, and the variety which bears his name "Moore's Early," is a lasting monument to his memory.

Garret R. Garretson one of the great fathers of the American seed trade, died at his home in Flushing, Long Island, N. Y., August 28th, in his seventy-fourth year.

C. M. Hovey died September 2d, in his seventy-seventh year, thus closing one of the most useful lives that has ever been spent in the field of American Horticulture. As an author we find him, in 1830, contributing to the New England Farmer. In 1835 he commenced the publication of the American Gardeners Chronicle, which was the pioneer of horticultural publications on the continent. In 1837 the name was changed to Hovey's Magazine of Horticulture, and under that name it continued its influential usefulness for about thirty-four years. He was one of the oldest members of the Massachusetts Horticultural Society, and it is said, that out of five hundred members of the latter, in 1835, but five survive him.

As early as 1830 we find him exhibiting thirty varieties of strawberries. He was the originator of the old favorite Hovey's Seedling, which for thirty years, according to the records of the Massachusetts Horticultural Society, gained the first premiums against the efforts of all other kinds to take this high honor from it. Numbers of the best new plants and fruits of the last fifty years were first introduced to the public from his nurseries and seed-house in Boston, and many new seedlings of great merit originated with him. A great and good man has gone, but his good words and works remain to bless generations yet unborn.

Sarah Hoopes. This good mother of horticulture, passed away at Westchester, Pa., on the 10th of October, in her ninetieth year, before most of us were born she was famous as an amateur horticulturist. The love of trees and flowers which took such active form around the homestead on Cherry Hill Farm had an immense power for good, and it is said that to her we owe the famous nursery firm of Hoopes Brothers & Thomas.

These, and Dr. George Thomas, of Chester county, whose last words

in his eightieth year before his spirit departed to join the great band on the other side of the river were "Let us go out and plant some trees;" and Alexander Mitchell, the great railway president, of Milwaukee, who was one of the most munificent patrons of horticulture in the Northwest, are a few of the names of the departed of 1887 which are as familiar as household words to us all. Let us ever cherish their memory and profit by their example. May our words and works be such that when we are gone other generations may be able to say that the world is better for our having lived in it.

J. S. HARRIS,
C. L. SMITH,
S. D. HILLMAN,
Committee.

IOWA HORTICULTURAL SOCIETY.

The annual meeting of the Iowa State Horticultural Society, at Des Moines was well attended. President Patten, in his annual address, stated:

The society has established trial stations, offered premiums for the introduction of new and adapted varieties, and the systematic practice of crossing and hybridizing which it is advocating will be productive of great good. It is demonstrating the wisdom of critical analysis of the situation before proceeding. It is, in short, every day making horticulture more of a success.

The annual election of officers resulted as follows:

President—C. G. Patten, Charles City.
Vice President—Eugene Secor, Forest City.
Secretary—George Van Houten, Lennox.
Treasurer—H. Sthrom, Iowa City.
Custodian and Librarian—G. B. Brackett, Denmark.

WISCONSIN HORTICULTURAL SOCIETY.

The annual winter meeting of this society was held at Platteville, Wis., beginning Jan. 10, 1888.

The following list of officers was elected:

President—J. M. Smith, Green Bay.
Vice President—B. F. Adams, Madison.
Secretary—B. F. Hoxie, Evansville.
Corresponding Secretary—A. L. Hatch, Ithica.
Treasurer—Matt Anderson, Pine Bluff.

LOCAL SOCIETIES.

The following, embracing a number of letters and valuable papers, read before local horticultural societies, are here presented, in addition to the regular reports made at the annual meeting of the Society, which elsewhere appear.

Following is a report of the Ramsey County Horticultural Society:

GERMAN AGRICULTURAL AND HORTICULTURAL SOCIETY,
OF RAMSEY COUNTY.

S. D. Hillman, Secretary, Etc.:

At your request I send you list of officers of the Ramsey County German Agricultural and Horticultural Society, to-wit:

President—H. Christoph.

Vice-President—Ch. Bunde.

Secretary—E. A. Venzke.

Financial Secretary—F. Spangenberg.

Treasurer—A. Giesmann.

Executive Committee—Ch. Bunde, A. Richter, Peter Hahn.

Society meets monthly as before stated in report last year.

Yours truly,

E. VENZKE, *Secretary.*

SOUTHWESTERN MINNESOTA HORTICULTURAL SOCIETY.

A local horticultural society was organized at Mankato April 13, 1888. Following is an account thereof from the *Daily Free Press* of April 14th:

“A meeting was held at Mr. Daniel Buck’s office yesterday to organize a local horticultural society. The following officers were elected:

President—Daniel Buck.

Vice-President—George Keenan.

Secretary—Edwin Rodgers.

Treasurer—Curtin Cooper.

“A committee was appointed to draft a constitution and by-laws. A great deal of interest was developed at the meeting and there is no doubt that the society will be of great benefit to the community. It is intended to have specialists prepare papers on various topics and read them before the meetings, to be followed by general discussions.

The meeting yesterday was devoted largely to grape culture. Mr. Buck presented a list of twenty-nine varieties with which he had had experience, and explained the excellence of each. The next meeting will be held the first Friday in May."

In its issue of May 5th the *Free Press* says:

"The recently organized horticultural society held a meeting at Mr. Daniel Buck's office yesterday afternoon and completed an organization. A constitution and by-laws was adopted. The name of the organization is 'The Southwestern Minnesota Horticultural Society.'"

The annual meeting will occur on the first Friday of October, while the next meeting will be held June 1st. Considerable interest is being displayed in this work, and it is expected that the society will attain a large membership.

MCLEOD COUNTY HORTICULTURAL SOCIETY.

The following papers were read at the annual meeting of the McLeod County Horticultural Society.

GRAPE GROWING FOR FARMERS.

By John S. Harris, La Crescent.

Mr. President and Gentlemen:

I am an ardent admirer of the grape fruit. It is a luxury that every farmer ought to be able to furnish for the use of his family in unlimited quantities. You are all familiar with its history and growing importance in this country, so that I need not take up your valuable time with pretty preliminaries and prefaces, but confine myself briefly to those methods that in my own experience have brought certain success.

I will start out with the broad assertion that good grapes can be successfully grown in many portions of Minnesota by all who select a suitable location and soil, plant the right varieties and give suitable attention to the preparation of the soil, planting and management. The best location for planting a grape vine is one that is high and airy and near lakes, rivers or other considerable bodies of water. A southern or southeastern aspect is the best for this climate, for the reason that our summers are short and the varieties we now have in cultivation require every advantage in warmth and sunshine that can be given to bring them to perfect maturity.

But few of our farmers have the lakes, rivers or other bodies of water, or even hillsides convenient at hand, therefore they should make the nearest approach to the latter condition that circumstances will permit. For setting a few vines for his own use let the farmer select the highest ground in his garden, and if it is not sheltered upon the north by a wall, fence, hedge, building or a grove of timber, let him improvise some other kind of shelter, if it be only two or three rows of plum trees.

In selecting the soil it is well to remember that a deep, warm, sandy loam, rich enough to produce a good crop of corn, and having a sub-soil that is not retentive of water, is about the best. Avoid deep, moist, mucky soils if possible, because they tend to promote a rank growth of pithy, immature wood, that is very likely to be killed by the autumn frosts, and produce fruit only of an inferior quality. If such soil must be used, let it be made as dry as possible by deep drainage and ridging. Stiff clay soils are not desirable, unless they are thoroughly drained and deeply worked. Stony ground, where there is soil enough to hold the roots, is excellent for the vine, and so rocky that it cannot well be plowed may be profitably used for growing grapes. It would be unwise to plant grape vines in the door yard by digging a hole in the sod, just large enough to receive the roots, or upon any new land until the sod had been broken up and rotted or brought into suitable condition for growing farm crops.

In the fall, before planting, the ground should be plowed or dug over as deep as the holes for planting will be made. If the land is comparatively new and reasonably good it is not best to use any fertilizers at the time of setting, or for several years afterward, unless it is vines instead of grapes that is wanted. If the soil is sandy or poor and worn out, lime, ashes, bones or the carcasses of dead animals are all useful to restore it to a normal condition.

On the farm land is usually plenty and cheap, and therefore it is good policy to give the vine plenty of room. Rows ten or twelve feet apart and the vines eight feet apart in the rows is a very good distance.

I consider the spring the best season for setting the vines, but it may be done with safety in the fall if they are well covered with mulch the following winter. Two-year-old plants grown from cuttings to a single cane and cut back to two or three eyes, or strong one-year-old layers are considered to be the best to use. In setting, dig the holes large enough to receive all the roots without cramping or crowding when spread out in a natural manner. Such plants, grown

from cuttings, have two sets of roots; let the bottom ones be spread out first, while the others are gathered up and held around the top with one hand, instead of mingling them all together. Fill good soil around and over them, making it somewhat firm; then spread out the upper set of roots and finish filling up the hole with the same kind of soil, taking pains to see that it comes in contact with every root; tramp the whole rather firmly, then draw about two inches of loose dirt over that. When finished but two eyes should remain above the ground. Some people advise deep planting. I would not dig the holes more than ten or twelve inches deep, and then if the top of the vine comes too high above the surface set them slanting enough to obviate it.

Treatment the first year.—If both eyes break and throw up canes leave but one to grow the first season, giving preference to the lower unless it is much the weakest. It is a very common practice to allow the vines to grow trailing upon the ground the first season, but it is better to train them upright to lathes or small stakes, but no pinching or summer pruning is to be tolerated more than to remove surplus canes that may start from the base. They will require frequent hoeing and cultivating about the same as corn and no weeds or grass must be allowed to grow to rob or smother the plants. At the close of the season after the leaves are fallen, say about November 1st, the vines are to be pruned, which is a very simple operation, consisting of cutting away all of the season's growth from about one inch beyond the first well developed bud above the base from which the cane started. Before extreme cold weather sets in they should receive winter protection, which is best given them by covering with dry evergreen leaves, boughs, straw, cornstalks or earth.

Treatment the second year.—The first operation after the opening of spring, is to remove the winter protection. This year two canes are allowed to grow instead of one, taking the strongest that start, one from base, the other from the opposite side of the spur that was left in pruning. All others that start are to be pulled out as soon as these have grown to a length of six or eight inches. These two canes must be tied to stakes which may be made of any small poles. When they have reached the height of about six feet they may be stopped once by pinching out the end bud (nothing more) and the ends of laterals may be pinched out after one leaf has formed, and if they start again after another good leaf has been formed, may be pinched out again beyond it, but no pinching allowed after August 1st. This practice is to insure stocky canes and well developed buds, but it should be borne in

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mind that it is injurious to remove full grown leaves at any time. At no age of the vine should any summer pruning be allowed more than the pinching out of the points of the growing canes. Cutting and slashing to develop fruit buds and ripen the grapes is a humbug and injurious to both vines and fruit. Clean cultivation should be given this season and every season hereafter. Early in November of this year the vine should again be pruned. The operation consists in cutting one cane back to two buds or eyes above the base, and the other to about four feet, and winter protection should always be given.

The next spring, which is the beginning of the third season, we should decide upon some system of training. The one arm renewal is an easy and a good one and very simple, and one that at any time can be changed into some other system. A trellis may be used in this system or sufficient support may be furnished for the vines by using two upright stakes, six or seven feet long, set two feet apart, one each side of the vine. For this system the cane that was left four feet long is to be tied to the stakes in the form of a bow, and the end of the canes that grow from it, should be pinched out after six or seven leaves have formed. One cane only should be allowed to grow from the short spur, and that is perhaps better to be stopped when about six feet long and the laterals treated as before recommended. The vine may be allowed to carry some fruit this season, after this liberal crops. In the fall after the fruit is gathered, and the leaves have fallen we do our pruning, and you can readily see why it is called a renewal system. In the pruning we cut off the single cane grown from the short spur at the top of the stake, and cut away all of the other cane, which has fruited, and its branches to one inch above the lowest branch, and that back to one or to eyes above the base. The long cane is designed to bear the principle part of the fruit next year, and the spur to grow a cane for fruiting the next year following.

If the vine is strong and healthy about the fifth or sixth year we double the fruiting capacity by pruning in such a manner as to have two fruiting canes and two spurs for growing fruiting canes each year, and in some instances double again. In these cases it is essential to have a trellis and tie the fruiting canes to it in a spreading or fan shape. If we intend to adopt the fan system from the start, we prune and manage the first and second season precisely as we have recommended at the commencement of this paper, but in the fall of the second year, instead of pruning one cane back to two eyes and leaving the other about four feet, we cut both back to two eyes and grow a cane from each eye. The next fall prune each of these canes back

to two eyes. At the end of the next season we will have eight canes, each alternate one of these we prune back to a single eye, and the other four according to the strength of the vine, from two to four feet. The following year one cane is grown from each single eye spur and the long canes are allowed to produce a crop of fruit. In the fall the canes from single eyes are cut back to a suitable length, and those that have borne fruit to one inch above the lowest side branch, and that to a single eye.

The best varieties for cultivation by farmers are Moore's Early, Worden, Concord, Delaware, Brighton and Martha. If a sour grape is desired for cooking purposes, the Janesville and Clinton might be added to the list.

SKILLFUL GARDENING.

By M. T. Ridout, Lakeside.

Mr. President, Ladies and Gentlemen:

By request of your worthy president, I appear before you this afternoon to give you a little plain talk on the vegetable department of horticulture.

Experience, although many times a dear teacher, is the sure method of gaining a true knowledge of what is required to bring about the best results in our immediate locality. The United States of America in its vastness, embraces a widely varied climate and soil.

Our soil and climate are well adapted to vegetable growth, and with proper culture great size and perfection are secured. As a matter of economy, also in a sanitary point of view, more vegetables should be grown and more consumed. This everlasting bread and meat business puts many a dollar into the doctor's purse while our own becomes depleted.

Fruit and vegetables should be allowed a more prominent place on the farmer's table. They are not only conducive to health, but they tend to expand and strengthen the intellect.

I will proceed to give our method of management, which has met with tolerable success, both financially and otherwise:

Select a piece of ground as nearly level as possible. If sloping at all, let it be towards the south. Manure heavily—say seventy-five wagon loads to the acre, with composted manure. Manure from the stables is better than that taken from the yard. Let your compost heap consist of two loads taken from the horse barn to one from the

cattle sheds. So alternate until you have the desired amount. Fork over and repile as often as smoke is seen issuing from the mass. Do not neglect this, otherwise it will "fire-fang" and thus destroy its value as a fertilizer.

This composting, if properly done, will kill all the weed seeds it may contain. Apply this to your garden early in the season and plow under at a depth of eight inches. Harrow as often as any signs of weeds appear until all are subdued. Manure again at the rate of twenty-five loads to the acre and turn under as before, only put the plow down ten inches instead of eight. This prevents the liability of clogging the plow with the manure first turned under. Harrow as before until all signs of weeds disappear. This gives you a clean, rich piece of ground for a next season's operations.

Next in order is, what shall we plant? And where can we procure good, reliable seeds? And when and how is it to be done? I will answer the first question, "What shall we plant," by giving you a list of seeds all "A No. 1," that will probably fill the bill: For early cabbage, Northrup, Braslan & Goodwin's Deep Head or Peerless; for late, Marble Head, Mammoth or Flat Dutch; lettuce, Early Prize Head; cauliflower, Henderson's Early Snowball; celery, Boston Market; egg plant, Black Pekin. For early tomatoes, Canada Victor or the Conqueror; late, Turner's Hybrid; peas, American Wonder, Dwarf and Wrinkled; parsnip, Hollow Crown; carrot, Denver's; beets, Eclipse for early, Long Blood for late; sweet corn, Cory for early, Stowell's evergreen for late; cucumbers for pickling, Green Prolific; melons, Water, Cuban Queen or Mammoth Ironclad; Muskmelon, Hackensack or Nutmeg; squashes, late, Hubbard, Boston Marrow or American Turban; early, Summer Crooked; turnip, Sweet German; string beans, Golden Wax; radish, White Strasberg; asparagus, Conover's Colossal.

Growing garden seeds is separate and distinct from gardening, as the term usually implies. Amateurs had better leave the growing of their seeds to professional hands. In former years I was of the opinion that seeds grown in the northwest were inferior to seeds grown south and east of us, but I have materially changed my mind, and so have seedmen generally. The majority of seed catalogues that find their way into our homes advertise northern grown seeds. But like the old renowned Hamburg cheese, no matter where made or grown, if the name is there the article itself must be all right. For the past two or three years I have purchased my seeds of Northrup, Braslan & Goodwin Co., of Minneapolis, and I find their seeds fully as reliable as any seed firm that I ever dealt with.

SOUTHERN MINNESOTA HORTICULTURAL SOCIETY.

At the fifteenth annual session of the Olmsted County Horticultural Society held at Rochester Jan. 7, 1888, the society was merged into the new organization, entitled as above, at which time a number of letters were read and papers presented, among which were the following:

Mr. Deacon read the following letter from Mr. Wyman Elliot, President of the Minnesota Horticultural Society:

LETTER FROM MR. ELLIOT.

MINNEAPOLIS, MINN., Jan. 2, 1888.

FRIEND SIAS: Your letter of December 30th received and noted. Thank you for the invitation to attend the annual meeting of your county society. It will be impossible for me to come down, as I have much to do preparatory for the meeting of the State Horticultural Society here the seventeenth of the present month.

I hardly know what to say to you with regard to the formation of a horticultural society, the tendency of which would be to draw away from the old Minnesota State Horticultural Society or divide the working force of that Society. You know as well as I do that we need to encourage the parent society as much as possible, and if possible give it greater efficiency in its broad field of labor. My first impression on reading your letter was that it would not be a benefit to the horticultural interest of the State. Would it not be better to organize these township horticultural societies and let them be auxilliary to the county societies, and the county societies made more efficient and capable of rendering better aid to the State Society, instead of creating a sectional society that will eventually detract from and divide the work of the State Horticultural Society? I may misunderstand the idea of forming another society within our State whose object would be to divide the work, and eventually the support we receive from the State. I think we should not do anything that will divide or cause sectional sentiment to arise to the detriment of our State organization. I have worked always with the idea of some day our State Society becoming a powerful factor in the development and dissemination of horticultural literature among the masses that will give an impetus to our art, and cause every thinking tiller of the soil to have confidence in our work. Then we shall not lack the means whereby to carry on the work successfully. One strong central organization

conducted on a broad and firm foundation will do more effective work than if we divide our interests. Let that be our *State organization*, and let us all rally around it and make it more able to carry on the arduous work before us of bringing into being fruit trees that are capable of withstanding our cold and rigorous climate. Pardon me for writing as I have; I may have misconceived the idea of the formation of the Southern Minnesota Horticultural Society.

We extend to the horticulturists of your section a cordial welcome and free entertainment. Please all come and help make the State Horticultural meeting the best ever held.

Faternally yours,

WYMAN ELLIOT.

LETTER FROM MR. POND.

KASSON, Jan. 6, 1888.

Mr. Sias and Friends of the Horticultural Society:

Agreeable to request I will give you a short report of the condition of the horticultural field in Dodge county. I say, however, that my experience as a fruit grower has not been very flattering. I have set more apple trees than I have had the privilege of gathering the apples therefrom. This, I have thought, was owing to carelessness on my part, in a great measure, in not taking proper care of the trees.

For two or three years I have been watching the doings of our State Horticultural Society and have concluded that I was not altogether to blame for my trees not bringing forth fruit. I have taken some pains to learn the facts of the fruit interest here. I find there is a better showing than I expected. The Duchess apple is all right and will pay every man ten fold for its space and time given to it. The Wealthy does fairly well and should have a place in every orchard; also the crab family is doing finely and should be in every garden.

Small fruits such as strawberries and raspberries have been raised here for the past ten years in bountiful quantities, though only for home use. The Concord and Janesville grape are becoming quite plenty in their season and of very fine quality. We have now such a fine hardy class of small fruits to select from that there is really no excuse why every one should not have his table well supplied with each kind in their season. Small fruit is a staple article in all of our markets, selling by the carloads. This is as it should be, and anyone owning a half acre lot can have all he wants without price.

The statistics of Dodge county show that we have now growing forty-five hundred apple trees, and only one hundred and thirty-one grape vines. This is a poor showing for a county as well settled as this is; also a fine field for a good, reliable nurseryman to work on. Now, my friends, don't conclude from the above statement that Dodge county farmers are not a fruit loving people, for such is not the case. We have been duped by tree agents often, and still there are many of us ready to try our luck again. I have seven Duchess trees that are now about twenty-five years old. They stand about twenty-two feet high and well proportioned. They look as hardy as oaks. I have probably taken six hundred bushels of apples from them. I have a few Wealthys also that are doing very well. The spring of 1886 I planted out two acres of the Ancient Briton and Snyder blackberry. I lost some of the plants through carelessness of shipping, but the past season they have made a big growth and ripened up the canes, so if there is any show for raising this fruit here I think I stand a good chance of having blackberries to eat and to sell.

Wild plums grow here as fine as any that can be produced anywhere and in large quantities, fully up to the Rollingsstone or any other native plum of the north. We have some seedling apples that have the appearance of being valuable. I am trying to induce the owners of these trees to let our experimental stations have some of the scions, but they appear to be afraid that someone will make some money out of it. I think they can be reached if the right man will undertake it.

If your society has any of the horticultural reports to spare I would like five or six to distribute here. I would be willing to pay my share of the tax to put one of these reports in the hands of every farmer in the entire State.

Yours respectfully,

C. H. POND.

LETTER FROM MR. HARRIS.

LA CRESCENT, MINN., Dec. 21, 1887.

Mr. President and Members of the Olmsted County Horticultural Society:

In looking up statistics on the horticulture of Minnesota, I find that your society was organized some fifteen years since and continues to maintain an active existence; that it is the only living horticultural society in Southern Minnesota proper, and that it is the oldest living county organization of the kind in the State. We have altogether

too few organizations of this character in our State, and the few we do have are too weak in their membership and too restricted in their field of operations. Their membership ought to comprise every intelligent citizen, whether professor, merchant, artisan or farmer, who is within reach of the meetings, and the work ought to cover every settled portion of the county or district within its corporate bounds; and I think it would add very much to the strength and usefulness of these societies if they would each start and maintain an experimental station, where everything new and unknown that is brought to public notice could be tried and tested before nursery agents were allowed to sell them to unsuspecting people. Such station would also be used for originating new varieties from seeds and for improving and ameliorating the wild fruits that are indigenous to this climate. Do not understand that I am finding fault with the work of the past, but that I am advocating new departures for the future.

Our State Horticultural Society is doing a good work, and I believe those of you who attend its meetings or have access to its annual reports will agree with me that there is not a better state society in the Northwest, if in the whole Union. It ought to have 5,000 members. It ought to be upheld and sustained by more liberal appropriations from the State, and its officers ought to be constituted a State board of horticulture, and under it should be placed the direction of the horticultural experiment work of the State station and all sub-stations within the State, and it should have the direction of the use of one-third of the amount given to our State for experimental work by the general government in the Hatch bill, that it may not be diverted from its proper use and may become of some little use to those for whose benefit it is given.

I am of the opinion that the State Society could be greatly strengthened and its sphere of usefulness enlarged through the organization of three or more district societies, regularly incorporated and recognized by State appropriations and a right to seat delegates in the conventions of the State Horticultural and Agricultural society, and a well ordered system of county societies; and I am also of the opinion that this is the opportune moment for starting the work.

Your society is old enough to throw aside swaddling clothes and come out in pants and top boots. The beautiful city of Rochester and the well ordered farms of Olmsted county show the imprint of your work. Why not broaden and enlarge your work so as to take in all Southern Minnesota? I do not mean that you should drop your county organization in order to start a greater one, but that you

should throw more life and vim into it and at the same time start a boom for the organization of a Southern Minnesota horticultural society, second only to the State Society, that may occupy the field before the next session of the State legislature. Such an organization would prove of great benefit to this portion of the State, and would lend new impetus to horticulture and rural adornment. I would have this society to hold annual meetings and exhibitions winter and summer for discussion and the display of the best products of the region. Our State is so large and many of our fruit growers live so remote from the places where meetings are held, that their attendance upon the State Society is out of the question. Many of such could and would attend the meetings of district societies, and would soon get enlisted as active workers in the cause.

At no time have the people stood so much in need of the education and information that is best imparted through association and experiment as at present. Upon the apple question we are badly at sea. Recent great drouths and unfavorable seasons have so broken up our old lists of ironclads that we are compelled to look about for something better to take their place or else throw the whole apple question overboard, and like school children, play that dolls are true babies, and Siberian crabs are apples and monstrous good. The better to put in their place offered in the recently introduced varieties from Russia and some seedlings of our own just coming to notice, are all untested as to quality, hardiness and adaptibility to Minnesota. To test these alone is of sufficient importance to warrant the organization of a score of societies and the expending of thousands in money.

Your fellow worker in horticulture,

JOHN S. HARRIS.

Following is the annual address of President Sias:

ANNUAL ADDRESS.

By A. W. Sias, Rochester.

Members of the Olmsted County Horticultural Society:

The cause of horticulture has no truer friend or trusty counsellor than the man who suggests that now is the time to "start a boom for the organization of a Southern Minnesota Horticultural Society."

That Rochester is also "historic ground," being the birthplace of

a State Society, is true as he tells us. It is also true that this was the first local horticultural society started in the State and the only one that has succeeded in maintaining an existence for any great length of time. Rochester is also historic ground as being the place where the first Farmer's Institute was organized this side of the Mississippi river, and we believe we might safely add this side of Lake Michigan. (I mention this fact because several other points have claimed the honor.) Again, Rochester is historic ground as the birthplace of the Southern Minnesota Fair Association which is far in advance of any other district organization in the State, and by widening our field of labor and drawing help and strength from the unoccupied territory outside of our county, we can greatly assist our fair association here in making far better exhibits of fruit and garden products, and so become mutual co-workers in one of the grandest of all enterprises. These being well attested facts, as regards Rochester's past history, it gives us great confidence in her ability to start the "Southern Minnesota Horticultural Society" on her way rejoicing in such a "God-speed" manner that she will never falter or turn back, and at no distant day become an honor to the place that gave her birth, and a blessing to the State at large.

One object in this new departure is to enable ourselves to render more and better service at our State Society of which we are all so justly proud. Owing to having several years start of local societies in other parts of our State, and perhaps we might add a slight advantage in regard to climatic influence, we should of right become, if we are not already, the most powerful auxiliary of the State Horticultural Society. This new departure should of necessity, providing each member acts well his part, increase the membership and result in more and better papers for the State Society.

The chief magistrate of Rochester possesses more than ordinary "horse sense," and when consulted as to the propriety of holding our annual meeting in the city hall, he most cheerfully approved of the proposition, and said he would have the council room warmed and reserved for our use on the day selected. The kind remarks made by the mayor on this occasion showed him to be a man of foresight sufficiently clear to discern the fact that Rochester could well afford to foster all such industries as the Olmsted County Horticultural Society whenever they see fit to take lodgment in her beautiful city.

The merchant can easily see that an increase of fruit and garden vegetables, both in quantity and quality, means an increase of business with him at the store and a more healthy condition of his family

at home Our noble calling has always been helpful in all the varied walks of life. Even the physicians acknowledge our aid, when we dispense sour crab apples to the little boys in early summer, although he has as little use for us as anybody, owing to the fact that the healthfulness of the country increases in proportion to our success in producing wholesome fruits.

The boot and shoe dealer can afford to speak a kind word for us, and take a ticket for a short excursion and diversion on board our beautiful craft, because he well knows that our traffic causes the young scape goats about town to wear out a large amount of extra shoe leather while stealing apples, plums, grapes and berries from our members, and that he is the only person who reaps much benefit from such malpractice.

The lawyer should have a "warm side" for us, for his services are liable to be called into requisition at any time, while trying to defend our property, which, as is well known, is the most attractive and by its nature the most exposed to the "light-fingered gentry" of any other property known to man.

The wagon maker should also encourage our traffic, for it is going to call a "heap" of wagons into use some day to haul our fruits and vegetables to market. In short, every vocation in Southern Minnesota will be directly benefitted by our occupation and the stimulant given it by your action to-day.

It is a trite saying, and as true to-day as when first spoken, that "in a multitude of counsellors there is safety," hence we have taken the trouble to advise with the leading horticulturists of the State in regard to reorganizing under the name of the Southern Minnesota Horticultural Society. E. H. S. Dartt, vice president of State Society, says: "You can count on me for membership fee and as much work as is consistent with present obligations." Every good enterprise ever yet started by mortal man has been sneered at by selfish and weak-kneed men, and we cannot expect to wholly escape criticism, but the fact that we have kept this society out of debt and in good running order for fifteen years, with all the obstacles that we have had to contend with, shows that we are not easily frightened or discouraged, and is certainly an indication at least that we are capable of occupying a wider field of action and assuming greater responsibilities. If, as someone has remarked, a "pebble when cast into the ocean on one side will create a ripple on the opposite side," then who knows but the new departure taken here to-day may create a ripple in horticultural circles that may be sensibly felt all over the Northwest. Let each member act well his own part, and the thing is done.

As this is my farewell talk to the Olmsted County Horticultural Society, perhaps we might be pardoned for taking a retrospective view, and inquire whether we have succeeded in doing anything commensurate with the time and money spent. In the first place, we claim to have done something to stimulate and encourage fruit-growing in the county. We have exhibited much fine fruit on the five hundred plates owned by us for many years past at the Southern Minnesota Fair; exhibits that have compared very favorably with the State Fair exhibits. We have annually distributed some fifty or more State horticultural reports where we believe they will do the most good, and that they will do much good no sane man for an instant doubts. Trees and flowers, as well as horticultural matters in general, have occupied the time and best thought of our greatest poets and scholars from time immemorial. See Bryant's poems: "The Death of the Flowers," "Planting the Apple Tree," "Blossom Time," by Mary E. Dodge, etc.

In conclusion, please accept my hearty thanks for the unmerited honors bestowed upon me from the organization of our society up to the present time.

INSECTS INJURIOUS TO HORTICULTURE.

By J. S. Harris, La Crescent.

Mr. President and Members of the Olmsted County Horticultural Society:

No one at the present day can expect to make a success of fruit growing without having some considerable knowledge of the numerous insects that prey upon the trees, plants and fruit. His best efforts are liable to bring only failure unless he has knowledge enough to recognize his irrepressible enemy and sagacity enough to devise some method for circumventing or destroying him.

For many years I have endeavored to awaken our people to the importance, yes, necessity of having a State entomologist appointed and paid to make investigations and impart information upon this all important subject, as it is needed by our farmers, but thus far I have not been able to awaken an interest sufficient to create a sentiment that would exert any influence upon our legislature, so they would deign to give the matter any attention. In the squabble for spoils, matters that pertain to the welfare of the producing classes are forgotten, and we are left to work out our difficult problems unaided and alone.

In the papers No. 1 and 2, read at your meeting in 1885 and '86, I have described the Apple Gouger and Codling Moth and their work upon the fruit, and suggested such remedies as are known to be beneficial. I am not egotistical enough to think that the papers have brought about any great amount of good, but I am happy to be able to report, that at my own place, and in such portions of the State as I have been able to take observations, the depredations of these two insects were much less in the last season than for many years before. I have but little time to devote to these observations and therefore cannot give positive reasons for it. It is a well known fact that when any one species becomes so numerous as to threaten the extinction of the food plants upon which they subsist, nature interferes and sends some enemy or parasite to prey upon them, and restore a balance by reducing their numbers. I will mention these causes that may have combined together to effect the decrease, viz: Drouth, birds and insect parasites. I place drouth first because the evidence proves its being sponsor for the others.

The summer of 1886 was noted for its drouth throughout the greater portion of this State and may have been favorable for the multiplying of the minute parasite insects that are here to a certain extent in all seasons, causing them to become so numerous as to keep down the injurious insects in 1887. 1886 was favorable also for the nesting of birds, but not favorable for plants or grasses in uncultivated lands, or fruits under the same conditions. There being nothing in the forests for insectivorous birds to feed upon, they were driven to the cultivated fields, orchards and gardens, about the abodes of men, and while their destruction of cultivated fruit was very great, they doubtless made up for it in a great measure by clearing our ground of the injurious insects. The summer of 1887 has been equally dry and the birds more plentiful than known before for many years. Therefore I think we may reasonably hope that some of our insect pests may not be as numerous for a year or two.

We have concluded to take for the subject of this paper, the Round Headed Apple Tree Borer, (*Saperda Candida* of Fabr *S. bivittata*, Say,) an insect that is injurious to the tree rather than the fruit. There is another of the borers that is found working in our apple tree more or less, the flat headed borer (*Chrysobothris Femorata* Fabr) or Apple Buprestis, but I think this first the most injurious one with which the orchardist has to contend. The beetle or perfect insect is not often seen because it flies only at night, but is easily recognized from the following brief description: It is long and narrow, varying from

three-fifths to three-fourths of an inch in length, and the width across the shoulders is about one-fourth of the length. The antennae are nearly as long as the body, slender and tapering, and when at rest are thrown backward and curved outward at the ends. There are two very distinct white stripes running from the head to the tip of the wing cases, between three rather broader cinnamon brown stripes. These stripes are so well marked and distinct that they are sufficient of themselves to distinguish the species.

The beetle makes its appearance in May and June, but remains quiet and hid during the day and therefore is seldom seen except by those who search for it. In this latitude the female deposits her eggs about the last of June and first of July, one in a place upon the bark of the tree, low down on the trunk or near the ground, or sometimes in the axils of the lower limbs. From these eggs hatch in about two weeks a minute footless grub of a whitish color with a yellowish head, which eats its way directly through to the inner bark and newly forming sap-wood. For the first year of their life they feed upon the sap-wood, making paths just the size of the body in the bark and sap-wood which are filled with their sawdust-like castings. Although its operations vary somewhat, and some writers state that it works upward from the place of entrance, what few observations I have been able to make, tend to convince me that during the first season it works downward toward the root of the tree, and that it remains at the bottom of the burrow through the following winter inactive. The following spring it commences to cut a cylindrical passage upward, and when about half grown it commences gnawing through the solid wood, continuing to enlarge the size of its burrow as its body increases in size, and pushing the sawdust so made downward and outward toward the orifice made for entrance, which has been somewhat enlarged. This burrow runs slantingly inward toward the pith of the tree and then outward, terminating at the bark. It does not now continue to mine into the bark, but filling up the burrow at each end and enlarging the cavity it makes for itself a place to undergo its last transformation, and then quietly awaits its change. When fully completed it pushes back the castings into its nest, gnaws a round hole through the bark, and comes forth and prepares to propagate its species.

Our best entomologists differ about the length of time it remains in the larvæ state. Dr. Fitch says they remain in the larvæ state two years, Dr. Harris from two to three years, and Prof. Riley three years. My observations lead me to believe that they remain in the tree about two years and ten months, and inactive about five months of each

year. The larvæ is a footless grub, and when full grown about one inch or a little less in length and something over a quarter of an inch across in the broadest part. They are of a cylindrical form of the second segment, of which there are thirteen, being bulged and somewhat broader than the others. The head is small, of a chestnut brown color polished and horny. The upper jaws are deep black, sloped at their tips which are obtusely rounded. The color of the body is a pale yellowish white and the consistence is soft and fleshy. The final change to the perfect insect occurs in May or June, after which the beetle comes forth from its burrow in the night during which time only it uses its wings in going from tree to tree hunting for companions.

Remedies: A number of remedies have been suggested but none of them have been so thoroughly practised as to make much impression towards their extermination. One writer says: "The great majority of the young larvæ reach the inner bark about the first of September and all have reached it by October 1st." The first half of October is the best time to search for and destroy them. Until that time they have done but little if any damage, and their presence is readily detected by a discoloration of the bark and their excretions on the trunk of the tree. They are readily found and dispatched by shaving off the outer bark with a sharp knife. If the trees have been neglected the first year the worms will be found in their burrows and must be attacked singly. Their presence can now be readily detected by the little holes through the bark out of which fine sawdust like castings will be found adhering. They can now only be destroyed by probing the burrows with a wire or cutting them out with a pointed knife. After the grub is destroyed the wounded place should be covered with grafting wax or a cement of clay and fresh cow dung.

Probably preventives are more effective than remedies. It is said that trees that are trained low so that the branches shade the trunk, and that are healthy, thrifty growers, are less liable to their attacks than those with exposed trunks and feeble growth. Doubtless in thrifty growing trees many of the grubs are drowned out by the sap before they get fairly established in the trees.

A means of preventing the beetle from depositing the eggs would be to clear all rubbish away from the base of the trees in the spring, and in the early summer months, June or July, rub soft soap on the trunks and in the forks of the lower branches, or wrap building paper around the trunks, to remain there during the period for depositing the eggs. It is not known that they are subject to any parasites, and the only aid in the animal kingdom for destroying the larvæ is the

wood-peckers, and the only valuable one among them the Downy wood-pecker (*Picus Pubescens*), which is a winter resident here, and the most valuable bird we have for destroying all kinds of larvæ that work in our trees, and it should be protected and encouraged to frequent the orchard by placing bits of fat meat in the forks of a few of the trees in the coldest weather. I have not been troubled very much with this insect while my trees are cultivated and kept growing thrifty, but as soon as the trees become stunted by growing in grass, injury from sun-scald, or hard winters, or any other cause, they soon fall a prey to them. A single borer in a large tree would not do very much injury, while three or four would girdle and kill it, and a single one would destroy a tree an inch in diameter. There are some nurseries that are infested more or less, and those purchasing trees should make a careful examination of them at the time of planting. The damage done the first year is slight, but the work of the second year together with the shock of transplanting will result in certain death.

The following paper was read by Mr. Deacon:

ORCHARDING IN MINNESOTA.

By Edward Deacon, Rochester.

The attempt to write an essay covering the subject of "Orcharding" seems like the effort of Queen Dido to encompass a kingdom with a bullock's hide, and since I find the essay, as she did the hide, too small for the purpose, am not sure but I shall follow her famous example, and taking but small shreds of thought, tie them together and simply outline or encircle the subject, leaving vast fields unexplored that properly fall within my outline.

Aware of the many controverted points in "orcharding," I shall endeavor not to lay down fixed rules where none as yet exist, but to ground my suggestions on what I believe to be the experience of the majority, as observed during some months of travel in the tree business in different sections of Southern Minnesota.

VARIETIES.

First, as to varieties. Few men find it convenient to buy their trees at the nursery, and thus avail themselves of the nurseryman's advice; but this is not so material, provided cool judgment and common sense are exercised in the choice.

Many Minnesota planters have yet to learn that a Duchess grown at Davenport, Ia., or at Dayton, O., is not so hardy as a Duchess grown at home; that apricots are utterly worthless in this State, and mulberries but little better, and that but few varieties of apples are yet safe to plant extensively in Minnesota. But if the planter will avail himself of such information as may be gleaned from the horticultural reports and farm journals of his State he need not act altogether in the dark when selecting his trees, and need not be wholly at the mercy of the Southern tree agent when he displays his brilliant profusion of colored plates and his magnifying jars of Southern fruit.

As to the question which must go, seedlings or Russians, we should not be so partisan as to cast aside valued and tried varieties of either class. For Southeastern Minnesota nothing as yet excels the Duchess for summer, and what have we yet found for fall and early winter that is safer than the Wealthy? Among the winter varieties the McMahon White is giving great promise of value for general planting. Of the hybrids, the Whitney No. 20 is among the best and safest for fall use. To summarize: If our object is fruit growing, we must plant the old stand-bys and not make experimental stations of all our orchards.

TRANSPLANTING.

But I am dwelling too long on this one point. Having decided upon the varieties, when shall we buy? If possible, have the trees removed from the nursery in the fall. This plan is being adopted more and more widely every year, and for valid reasons. In digging the tree many roots are necessarily cut by the spade. Now if these roots are neatly pared with a sharp knife and the tree buried for the winter, these root ends will heal over during those long months of rest, and be ready for business as soon as transplanted in the spring much sooner than if dug in the spring when the sap is flowing and the buds are swelling. Again, should there be an uncommonly severe winter, the vitality of even our hardiest varieties will be taxed more or less if standing in the nursery; if now in the spring of the year you tear it from its mooring and transplant it, the tree has a double injury to overcome, and will most likely make but a sickly growth during the first summer, whereas the tree from the pit, with all the vitality it had when buried (some say even more), its roots nicely healed, goes to work at once for a good year's growth and is well prepared for the test of its first winter.

As to the best age for transplanting, a three or four year old tree is

to be preferred, as trees of that age, if properly dug and trimmed, have plenty of root for their support.

LOCATION.

A very important item in "orcharding" is the selection of a site. It is now pretty generally conceded that a northern or northeastern slope is to be chosen if possible. This avoids, in a measure the repeated freezing and thawing of early spring which has been so prominent a cause of mortality in most orchards. But if a southern slope must be taken these ill effects may be largely overcome by heavy mulching around the trees before the thawing begins in the spring. Again, choose the highest ground possible. All experience proves that the hills and not the valleys are the best places to raise apples in Minnesota, as the temperature falls much lower in the valleys than on the high grounds.

Concerning the proper soil for apple trees, we cannot yet speak with much assurance. In floriculture it is known, for instance, that the cactus loves the sand, the heliotrope flourishes in a moist black loam, but who has yet ascertained the exact proportions of black loam, of clay, and of sand, the precise amount of moisture and degree of fertility in the soil best suited to the wants of the Wealthy or any other variety? But the soil usually preferred by planters for an orchard of all varieties is, I believe, a rich loam with a liberal proportion of clay. If the soil is already rich it will do as it is for young trees, but if weak fertilizers should be used. If mainly sand a large hole should be dug and filled with soil of a suitable quality in which to plant the tree; this with proper fertilizing will overcome the lightness of the soil.

SETTING.

Before it freezes up in the fall it is well to dig the holes for the trees, as the effect upon the soil of the freezing and thawing and exposure to the air seems beneficial to the young trees. And in digging the holes the question of distance must of course be settled. Many, in planting orchards, stand the trees one rod apart each way, others two rods. But most varieties when given but one square rod of land will in old age overreach their allotted bounds, and interlace their branches with the neighboring trees, thus becoming much more subject to the infectious blight, and dwarfing all the fruit on the lower branches. It is better economy to strike a mien, some of the smaller varieties doing well at twenty feet apart, others needing twenty-four feet, but few, if any, needing as much as thirty-three feet.

As soon as the ground is in good condition in the spring, the trees should be taken from the pit as fast as they can be set in the orchard. With a pailful of water and a rake or hoe, make a puddle of very thick mud in the bottom of the hole in which you are to set the tree; settle the roots into this mud till every root is covered with it. This precaution avoids the danger of leaving open spaces among the roots and secures, in a measure, against the drouth. Over this mud put several inches of dry surface soil and press it down hard. This prevents the ground from cracking as it would if the water were poured upon the surface, and it acts as a mulch to retain the moisture below.

The depth to which a tree should be set must depend on the soil. If in a moist location, one or two inches deeper than it stood in the nursery is sufficient. If in a very dry place, it had better be down four or five inches deeper. The young tree should be leaned a little to the southwest when set for two reasons. First, in order that the trunk of the tree may be shaded by its own leaves and branches to guard against the "sun scald." Some planters take the precaution to drive down a sharpened board on the southwest side of the tree, as this is the direction of the hottest rays, and the practice is to be commended. Again, as our prevailing winds are from the southwest, if the tree is set vertically at first, it will in time, if exposed to the winds, be found leaning to the northeast. If the loss of root in digging has been considerable, the top should be cut back in proportion.

Now, before you call the tree fully set, attend to the mulching. Bring some old rotten hay, straw, chip-dirt or saw-dust, and bring it in liberal quantities. Do not put it against the tree, but leaving a few inches of bare ground around the tree, let the mulching extend back three or four feet in every direction, and make it thick enough to hold the moisture in the ground. A very good and lasting mulch is made of broken bricks or small stones. If the drouth should be long and extreme, it may be well, perhaps, every three or four weeks to put a few pails full of water on the mulching, but water with care, and remember that large numbers of trees are killed every year by over watering, and it has been found by observation to be often the case that the more wheat and corn a man loses by drouth the more trees he will kill with water, being very persistent in his overnursing, till the tree finally gives it up in despair, while his neighbor, who has had no time for such work, can show a vigorous orchard. Don't water too much.

When the trees are planted and mulched, don't sign their death warrant at once by turning in the hogs and calves, but put the ground

to better use, you may thus save yourself and neighbors the discouragement and disgust with "orcharding" that must necessarily follow from watching a nice young orchard grow sickly and die without understanding the cause. While the trees are small use the place as your garden; you can raise your potatoes, onions, and cabbages there with great benefit to young trees and thus suffer no loss of ground. Continue this practice till the trees are too large to allow the vegetables a healthy growth, when the trees themselves will pay for the ground they use—even then they should not become sod-bound, for if we expect the tree to draw several bushels of nice apples every year from the same soil, we should assist nature in the work by enriching that soil. I do not believe there is much danger of forcing too rank a growth upon a bearing tree.

WINDBREAKS.

We must not forget or neglect to shield our orchards from the blizzards and the cyclones by a good and sufficient windbreak. An evergreen windbreak should be secured if possible, on account of its superiority, in winter, over every other kind, and its beauty at all times of the year. And for this purpose we may well place the Norway Spruce at the head of the list, and the White Pine second, and several other varieties are to be preferred before deciduous trees. Where evergreens cannot be obtained the white willow should be used, as its hardiness, its rapid growth, its beauty and strength make it one of the most efficient of deciduous screens. It is a noticeable fact that most planters place the windbreak too near the orchard. It should stand back ten or fifteen rods, in order that the heavy snowdrifts lodged by the windbreak may lie outside of the orchard. This windbreak should stand upon three sides at least, north, west and south. The east is not so material.

How to bury a tree for the winter; how to properly prune; how to keep the bark healthy; how to guard against borers, caterpillars, and other insects; against rabbits and mice. The entire topics of plum and cherry culture are divisions of the subject of "orcharding," upon which I have not touched, but I fear I have already written at too great a length.

One more thought. What means the cry, "We can't raise apples in Minnesota?" Does it mean that all those that utter it have given the matter earnest, thorough and intelligent trial, and speak from experience? I cannot believe it. For, by some travel and inquiry, I have found that most of the trees planted come from southern nurse-

ries directly or indirectly, or else have been killed by the planter's own negligence or his not knowing how to properly handle them. Until, instead of trying to improve his methods, he becomes disgusted with the business and joins the popular cry. It was the cry in Michigan, Wisconsin and in Iowa. But the successful effort of persistent men are silencing the cry there, as they will do ere long in Minnesota.

NOTES ON ONION CULTURE.

By Wayland Stedman, Rochester.

An Irish woman once told me that "it was very poor onion seed I was selling her; I had sold her an ounce of seed, last spring, and never an onion was larger than the smallest egg; and it was the best cultivation she gave them; for she plowed the ground a foot deep and made it as loose and fine as a pile of ashes and raked the seed in with a garden rake, and kept the soil pulverized all summer with a hoe."

Now every onion grower knows that her method of culture would have given a fine crop of potatoes, but was a ruinous one for onions. I have found that many farmers think they cannot raise onions; as I have often asked them to buy a few ounces of seed and sell us onions in the fall, and in many cases the answer was: "O. onions won't grow with me; I tried to raise them some years ago and made a failure of it, and now buy what few we want."

Of course, onions are not so accommodating as wheat and oats. They are like some men, they must have their own way; but, unlike many men, they are not ungrateful, for give them the soil and culture that they require and they will return the kindness by yielding eleven hundred bushels per acre. Every family ought to consume a great many onions, for of all cultivated garden vegetables they are the most nutritious and contain more medicinal properties.

SOIL.

Onions must have a well drained soil. If the soil is heavy and allows water to stand on its surface, the onion roots will all be very close to the top of the ground, and will not penetrate into the soil and collect sufficient plant food to make a good crop. Black soil, with a sandy subsoil, is good. A slough, underdrained, is a number one place for onions.

Experience has taught me the necessity of thorough drainage, and

I will not soon forget it, for some years ago I lost the entire crop by sowing the seed on a rich, black mucky soil. I expected a great crop and kept the ground clean, but I found that after every rain the onions did not grow at all for two or three weeks, and the result was that in September the tops were fresh and green and as far from being matured as they should have been in July. The next year I cross-plowed and made ditches lengthwise and crosswise, and the crop was good, some onions being as large as saucers.

Onions were first grown in Egypt on the fertile banks of the Nile, which were yearly enriched by the overflow of that river. And for that reason good crops of onions cannot be grown on virgin soil without some kind of manure, although I have heard that good crops have been raised on new breaking, the seed being sowed broadcast and dragged in. But that was done a great ways off, and I never saw the man who did it. If done at all, it must have been in a soil on which large quantities of brush and trees had been burned, leaving the ashes on the ground. Ashes containing potash are one of the best onion fertilizers.

MANURE.

Onions need, for a heavy crop, more nitrogen and potash than is to be found in new ground, hence the ground should be manured every year. Animal manure contains both nitrogen and potash. Unless the manure is old the onions are liable to be soft and have large necks and do not keep well. Horse manure is better than cow manure. Greener manure can be used if spread early in the fall and plowed under. If the manure is very fine it will go further if spread after plowing and dragged in.

Long Island onion growers buy horse manure direct from the street car stables of New York city and put one hundred cart loads on an acre. Sometimes they pay as high as sixty-five cents per load. The manure is not mostly straw, like our manure out West, but contains very little litter.

A German farmer not far from Rochester always raises good onions with no other manure than ashes. He throws all of the ashes, the year through, as fast as made, upon the onion bed, scattering them during the growing season upon the rows. Ashes not only furnish plant food but also help to keep the ground moist, which is very important for onions. Thirty or forty loads of well rotted and moist stable manure, spread in the fall and plowed in the spring and dragged in, will give a very large crop of sound and well keeping onions.

PREPARATION OF SOIL.

A suitable onion soil should be selected. Manure heavily during winter or spring with any kind of manure and plow very early and deeply eight or ten inches at least. About the first of June plow again the other way and set out late cabbages. The ground is plowed twice to mix the manure with the soil and to help drain the soil, and it is plowed deeply so that some of the manure at least will be well under the ground where it will collect moisture, and store it up for the use of the onions in the following year. Also, the presence of manure at the depth of six or eight inches will prevent the soil from becoming very hard at that depth. This is important, for the next year the ground is plowed quite shallow.

The ground is set with cabbages because cabbages are easily kept clean, most of the work being done with a cultivator. Not a weed should be allowed to grow to seed. The cabbages should be all pulled up by the roots. In the fall as soon as the cabbages can be taken from the ground, spread on the well rotted manure. This manure, being hauled during the winter or spring before, and put in a pile about six feet high with a flat top, under a roof if possible, has fermented and most of the weed seeds are killed. The ground is then to be plowed about four inches deep and left without being dragged during the winter.

In the spring, as soon as dry enough, the ashes are spread, if at hand, or fine muck or peat marl or land plaster is sometimes used. Then the ground should be dragged until very smooth and quite firm. It is important to have the ground firm, but of course not hard. If there are sticks, stones, roots, etc., on the ground they should be raked off with a steel rake. Then the seed can be sown, and this can be done better and quicker with a seed drill. I use the Planet, Jr. The rows should be twelve or fifteen inches apart. On soil not very rich three pounds of seed are enough for an acre, but on ground prepared as above directed six should be sown. Four or six pounds are usually sown upon an acre.

Onions will sprout in as low a temperature as wheat, while weeds will not. Therefore the importance of preparing the ground in the fall. Any weather that will not injure wheat will not injure onion seed. But new American grown seed I am speaking of, and they will stand more unfavorable weather than imported seed or old seed. In fact most imported seed is not hard and should be sown later. Imported seed produces larger onions, but they are milder, softer, and do

not keep as well as those raised from American seed and are never sown extensively. The bulb of the onion should be on the top of the ground because it does not in anyway feed the plant. That is done by the long white roots which often are from six to eight inches in length. It is also a fact that onions will not bottom unless the soil is firm. If the soil is mellow and loose when the seed is sown, the onions will not form bulbs until the rains have packed the ground. Fall plowing becomes firm sooner than spring plowing, and for this reason we get earlier onions from land fall plowed.

CULTIVATION.

It is almost needless to say that the onion patch should be kept clean. Cultivation should commence as soon as the rows can be seen, even if there are no weeds. It seems impossible to raise onions without hand weeding, as very rich ground will produce a great many weeds. Hand weeding is the great drawback to onion culture, for without it onions could be raised cheaper than potatoes. And the onion grower who keeps his ground clean with the least hand weeding makes the most money. Hence the importance of allowing no weeds to seed the year previous on ground sown to onions and of making the manure heat to kill the seeds it contains. But in spite of all that can be done some weeds will come up. If the rows are very straight a wheel hoe or shovel hoe can be run within a quarter of an inch of the onions when they are small, thus considerably lessening the work of the hand weeder. In dry weather perisperm grows in great quantities and is looked upon as a great enemy, but I sometimes think it is a friend; for if it is kept hoed up, the surface of the ground will be loose. If the surface of the ground is kept loose to the depth of an inch the soil next under will not dry out as much as if the surface is baked hard. The loose soil on top acts as a mulch.

As soon as the onions are ripe they should be pulled at once, for the fall rains will make them grow again. And if they commence to grow after they are ripe they are nearly worthless. They must be used at once for they will not keep. They will sprout and grow, no matter how dry they are kept.

The best way to pull onions is to use a potato hook or a dull pointed iron rake; raking out one row at a time and raking two rows together. If the onions are sown early they will mature early, and if allowed to lay on the top of the ground for a few days during a dry time, the tops will dry up to almost nothing and can be very rapidly broken off with the fingers when picked up. Cutting off the tops is slow and

expensive, and onions do not keep as well as when the tops are pulled off. After the onions have remained in rows for four or five days and are dry, they should be stored under cover until freezing weather begins, and then put in the cellar, and they will keep perfectly sound until the next June, if they have been perfectly cared for. I have kept white onions without a sprout until spring.

Mr. Lory, of Isanti county, by request furnishes a paper on the cranberry.

CRANBERRY CULTURE.

By H. A. Lory, Maple Ridge.

What little information I have gained on the cultivation of cranberries has cost me rather dearly, but is gathered from an experience extending over a number of years. It may not be amiss to mention some of these incidents of this experience, in this branch of fruit raising.

I was brought up in Schohaire county, New York; resided in Wisconsin eleven years, and since November, 1875, in Minnesota. I owned five different marshes in Wisconsin, but none of them proving satisfactory, I spent more or less time during a period of three years in securing a better location for conducting the cranberry business; have traveled thousands of miles, crossing the country by the use of maps and charts, and a surveyor's compass.

In Wisconsin I met an old Indian chief possessed with more than usual intelligence, who in answer to my inquiry, said I should not be discouraged in looking for a desirable marsh, as it would be found by diligent search. It should be stated that while there are good marshes, there are many contingencies that enter into the question of success or failure, such as the character of the soil, climate, stage of development of the marsh, its capacity for the growth and perfection of berries, etc. A marsh may be entirely unsuitable for cultivation, or it may have been well suited for development for thousands of years.

A marsh may have the required elements to mature sound, healthy vines and fruit. But a good marsh may change suddenly altogether, the soil becoming fermented, sour and poisoned from a change of temperature, from dams, ditches, etc., and thus the best stage may have passed by never to return. On the other hand, its best condition

may not have been reached; as to this fact, however, time and experience alone will determine. A period of ten years is none too great, in my opinion, to ascertain fully in regard to this matter.

Some marshes prove to be superior to others and produce fruit almost spontaneously among the mossy roots, rubbish, etc., but when the conditions change and the underlying substratum fails to provide the required nutriment it may result in a necessary abandonment of the marsh.

Many seem to entertain the idea that it is all clear gain in cranberry culture, and there are enormous profits to be realized within a period of three or four years at most. If, however, they engage in the occupation and no results are realized, they become discouraged, without taking into consideration the conditions and methods of success. It should be borne in mind that where one succeeds there are perhaps fifty who make a failure. I do not advise anyone to engage in this business unless he is able to experiment in a thorough and systematic manner, whether successful or not.

I have been told that I was very foolish to stick to this "old cranberry swamp," and to work and expend all the money I could get when I never could make it amount to anything. These theories have not, however, discouraged me from continuing my efforts. I feel confident I have passed the most difficult point, and am more and more encouraged each season.

My marsh is now well subdued, is in good form, occupying about one hundred acres. Have about three inches fall, affording ample means to dispose of surplus water, and, by the use of an upper gate, an ample supply of water when needed.

A marsh may possess nine points of excellence, and one undesirable feature may overbalance them all. Some peat is too soft, some too hard, some too wet, some too dry; again the water may injure the vines. Where a marsh has had only rain water upon it, and it is replaced with mineral water, it may prove disastrous, or the reverse. Much damage may be done by a novice using too much or too little water, as it must be used at proper times and in sufficient quantities for the purposes required. I find the injury when it occurs, increases usually in a ten-fold ratio.

I met a man below St. Francis some years since, who said he drew the water from his vines about June 15th, but could give no reason whatever, as to warmth, drouth, or fertilization.

The season here being of short duration between killing frosts, it requires finer manipulation than where seasons are longer. I have ex-

perienced injury from frost as late as June 20th, and as early as August 13th, and much care is necessary in the management of the marsh, to secure desired results. One must understand the whole situation. The water in the spring must be retained long enough, but not to prevent growth of vines and maturing of crop, at the close of the season. Depth of water is another item, its use depending upon the objects to be secured. In my experience it is not proper to give the bed water before October 15th, and not according to nature. Last season I let on the water November 1st, and drew it off May 1st. My berries matured thirty days earlier than ever before known, and I commenced picking August 15th, and finished on the 24th. The next morning, the 25th, there was a heavy frost. A neighbor who had a few berries, picked but few of them, as they were too green.

I have spent some fifteen years experimenting. When I began I supposed I was a master of the business, and that all there was to do was to gather the fruit. I have found this to be a serious error, and feel that I know very little about it as yet.

My entire crop was estimated at 3,000 bushels, but on account of fire July 2d to 7th and cut worms I only harvested 250 bushels. Was awarded first premium at the State fair last fall and also at the winter meeting of your Society. I would like to see more samples of fruit exhibited at our fairs.

THE PEERLESS APPLE.

By O. F. Brand, Faribault.

At the request of the President of our State Horticultural Society, made at our State Fair in 1886, for the history of this celebrated apple, I will now give it.

In 1857 or 8 Geo. Dorrance, now deceased, of Walcott, Rice county, planted an orchard of several hundred apple trees. It was on the extreme eastern edge of the Big Woods, facing and open to the prairie on the north and northeast. The varieties were Wine Sap, Fall Orange, Fameuse, Red and Green Sweeting, Golden Russet, Talman Sweet, and other popular Eastern varieties, together with six trees of the Duchess. The latter were among the first to bear, and those six trees became celebrated in this part of the State nearly a quarter of a century ago. I first saw the orchard in 1864, and frequently in 1866. In 1867 the orchard bore a large crop, Duchess being heavily loaded. Talman Sweet and Golden Russet stood not far from Duchess, blossomed and bore a little fruit that year. I think it was from the crop of 1867 that G. J. Miller, who then and still resides two and one-half

miles from this orchard, saved a quantity of seeds from Duchess apples from Mr. Dorrance's trees. He planted the seeds on his farm on the prairie and from them raised more than 200 trees. He says he planted seed from no other variety but Duchess. He cultivated these trees up to 1872. That winter, 1872-3, killed the most of them. The best of those that lived he transplanted to his orchard in the spring of 1873, there being about a dozen of them.

I saw these seedlings for the first time in the fall of 1875. Several of them were then bearing, and some of them well loaded with fruit. I did not see the fruit of Peerless at that time, as it bore but three apples that year and someone had stolen them. I was so impressed with the appearance of the tree that I then and there wanted to buy the right to control it for one year, and offered Mr. Miller such a large price that he became alarmed as to its probable value, and as a result I did not get the scions and the tree was not propagated from till the spring of 1887. This explains to the public why there are no trees of it for sale.

The fruit of Peerless and several of the other seedlings was shown at the State Fair in 1878, and also at the winter meeting of this Society in 1883. A half bushel of Peerless apples was sent to New Orleans in 1884. It took the First Premium at our State Fair in 1886 and was there awarded \$5 as the "Best apple for all purposes of Northwestern origin." Being on exhibition at our winter meeting in January, 1887, it was pronounced by vote of this Society "The best seedling apple known."

Of the productiveness of the Peerless I will say, it bore one bushel in 1876, kept increasing in its yield till it bore seven bushels in 1882, nine bushels in 1884, about one bushel in 1885 of extra large fine apples, and more than ten bushels in 1886. Mr. Miller says of the fruit that it averages as large as Wealthy, if not larger; ripens from ten to twenty days later; hangs on the tree in a high wind perfectly; keeps better than Wealthy and is fully its equal in flavor and quality.

Mr. Miller's orchard is on a black loam, prairie soil with clay subsoil, and is on the prairie about two miles from the edge of the Big Woods, and more than ten miles from any lake. The location is a bad one, as is proved by the fact that five-sixths of Duchess and all of Wealthy in the same orchard were killed in 1884. In 1885 the orchard seemed to be the hot-bed of blight, yet Peerless escaped uninjured.

There is not another tree in the known world that has stood or can stand what Peerless has stood for twenty years, and produce the large crops of fine winter apples it has produced. It is rightly named, it has no peer or equal in this dry, cold, windy climate.

NORWAY SPRUCE FOR SHELTER BELTS. •

E. H. Ricker, in a recent issue of *The Farmer*, of St. Paul, says:

“Nearly all the thrifty growing evergreens are valuable as a shelter belt where they are hardy, but the tree that has stood the test, and has proved the most valuable as a tree for shelter is the Norway Spruce. It is hardy, is adapted to prairie soil, and where it has been properly handled and well cultivated, has given perfect satisfaction. It is a tree that commends itself, and all that is necessary is for the people to become acquainted with it. As we have had an opportunity to know this tree and see it grow for many years, we feel fully capable of telling your readers its value as a protection. We give a short history of the Norway Spruce in this vicinity:

“Two or three years ago a row of Norway Spruce was planted along a roadway in the Elgin nurseries, by D. C. Scofield, a resident of that city. The farm selected by Mr. Scofield was about one and a half miles west of the city, on the open prairie. Not a sod had ever been turned—it was the virgin prairie. He started the plow, and got a piece of ground in as good condition as possible, in the tough prairie soil. The next year he sent his order to a large nursery firm in Scotland for a quantity of small Norway Spruce seedlings, there not being any nurseries in this country at that time where the Norway Spruce was grown in large quantities. They arrived, after being many weeks on the ocean, and thence by rail from New York to Elgin. Not a tree failed. The plants were two years old at the time of planting. At the expiration of ten years, accurate measurements, made by the Horticultural Society of Illinois, as recorded in their report, showed that many of them were over two feet in circumference, and over twenty feet high. Measurements recently made show many of them to be six feet ten inches in circumference, and seventy-three feet high; and for twenty-two years they have been a protection against the fierce storms of this climate. Although Mr. Scofield was upwards of fifty years of age at the time of planting, he still enjoys the benefits of this magnificent shelter belt. His experience proves that a man past middle age may enjoy many years of pleasure and profit, as a result of his foresight in planting evergreens for protection.

“We recommend Norway Spruce as the best for shelter belts; the next in order are American arbor vitæ, red cedar, and American white spruce. White, Scotch, and Austrian pines are reliable evergreens, but we do not recommend them for shelter belts.”

We give a very good representation of the Norway Spruce, as shown in *The Farmer*:



NORWAY SPRUCE.

Mr. Sias, of Rochester, recommends evergreens highly for shelter belts. He gives the following list:

1st, Norway Spruce (*Abies Excelsa*); 2d, White Pine (*Pinus Strobus*); 3d, Red Pine (*Pinus Resinosa*); 4th, Hemlock Spruce (*Tsuga Canadensis*); 5th, White Spruce (*Abies Alba*); 6th, Scotch Pine (*Pinus Sylvestris*).

He says: "We head the list with the Norway Spruce, first, because it is capable of resisting a stronger wind than any of the others, unless it is the white spruce; second, it has more fibrous roots, hence less loss in planting; third, it is a fine looking tree. Josiah Hooper says: 'Of all the hardy evergreens this appears to be the most suitable for shelter, dense and compact in its growth, hardy to the utmost degree, and vigorous in almost every soil; it is certainly the perfection of plants for a screen. We must confess to having nothing that will compare with this invaluable tree for all purposes.'"

YELLOW TRANSPARENT APPLE.

Syn.—Yellow Transparent, White Transparent, Red Duck, Charlottenthaler, Grand Sultan, Russian Transparent.

Mr. Gibb, of Abbotsford, thus describes this variety: "No. 334, Yellow Transparent (*Skvosnoi joltni*). This is now widely known. It is earlier than Early Harvest, and much like it in appearance and quality."

Yellow Transparent is one of the seven leading varieties of apples recommended for planting in Wisconsin, by the Horticultural Society of that state.

Mr. Wm. Toole speaks of this variety as observed in the orchard of A. G. Tuttle, of Baraboo, in the following glowing terms: "A clear, waxy, white-skinned apple, of good quality, juicy and very early. It is hardy, a constant and enormous bearer." (See vol. xv, p. 455.)

Geo. P. Pfeffer, of Pewaukee, at the late annual meeting of the Wisconsin Horticultural Society, reports that "in his search in different orchards in Wisconsin he finds Duchess and Tetofsky the best preserved varieties, although Alexander and Transparent are found to be all right." Of a dozen or more Russian varieties set in his own orchard he says: "Those that are satisfactory are Yellow Transparent, Long Arcade, Hiberna and Longfield."

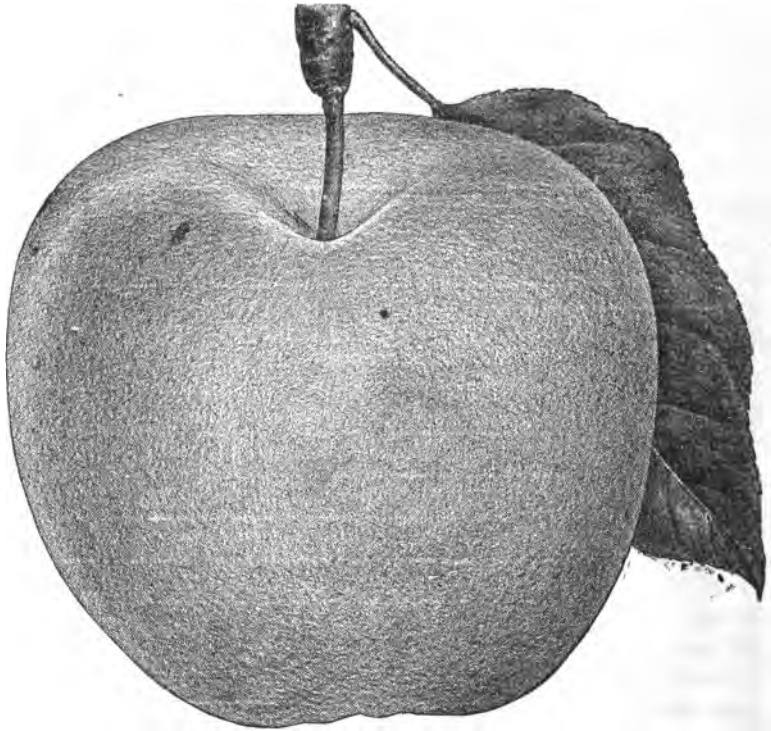
Says Farm, Stock and Home: "If the efforts to introduce Russian apples into the Northwest had resulted in but this one acquisition, it would amply repay all trouble and expense. It is the best *very* early apple, pleasanter than the Early Harvest in flavor, ten days at least earlier, better and younger bearer, and much superior, as a keeper, to any early apple. It has that mellow, luscious appearance of the Sweet June, with its minute specks. Undoubtedly it would pay to plant it quite extensively near Minneapolis and St. Paul for the city markets."

J. T. Lovett, of New Jersey, says of it: "The earliest of all apples; handsome and good. Of Russian origin, and like all the Russian apples, of ironclad hardness. It ripens fully ten days in advance of Early Harvest, Primate and other early varieties. Tree a free, upright grower, very prolific, and a remarkably young bearer, frequently producing in the nursery rows the second year from the bud. Fruit growers in New Jersey who have this apple in bearing are realizing immense profits from it."

Dr. Hoskins, of Vermont, says: "The tree is a free and symmetrical grower, upright when young, but spreading as it becomes older

under the loads of fruit. It is a healthy tree, and like most of the Russians, ironclad against cold, enduring forty degrees below zero without injury. It is a heavy bearer annually in rich gardens, but biennially in poorer soils or in sod. The fruit fairly grown, is medium in size, though specimens that would rank as large may often be found on young trees in good soil. In delicate, waxen beauty, the Transparent, when allowed to mature upon the tree, is unequaled among American apples. The fruit is always fair, and its attractive appearance, joined with its very good quality, makes it extremely salable. As an early market apple it has great merits. If gathered just as the seeds begin to color, it bears transportation well, and will keep two weeks or more before showing any signs of deterioration."

We are under obligations to *Farm, Stock and Home* for use of cut of this New Russian apple.



YELLOW TRANSPARENT APPLE.

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HORTICULTURAL SOCIETY,

FOR THE YEAR 1888.

EMBRACING THE

TRANSACTIONS OF THE SOCIETY FROM MARCH 31, 1887, TO MARCH 31, 1888;
ALSO PROCEEDINGS OF THE ANNUAL MEETING OF THE
MINNESOTA AMBER CANE ASSOCIATION,
ESSAYS, REPORTS, ETC.

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1888.

the 1990s, the number of people in the UK who are aged 65 and over has increased from 10.5 million to 12.5 million, and the number of people aged 75 and over has increased from 4.5 million to 6.5 million (Office of National Statistics 2000). The number of people aged 65 and over is projected to increase to 15.5 million by 2020, and the number of people aged 75 and over to 8.5 million (Office of National Statistics 2000). The increase in the number of people aged 65 and over is expected to be due to a combination of factors, including a decline in the birth rate, a decline in the death rate, and a decline in the rate of emigration.

The increase in the number of people aged 65 and over is expected to have a significant impact on the UK's health and social care system. The number of people aged 65 and over who are in need of health and social care services is expected to increase significantly in the coming years. This is due to a number of factors, including a decline in the birth rate, a decline in the death rate, and a decline in the rate of emigration. The increase in the number of people aged 65 and over is expected to have a significant impact on the UK's health and social care system.

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